REMEDIAL DESIGN / REMEDIAL ACTION STATEMENT OF WORK
W.R. Grace (Acton Plant) Superfund Site, Acton & Concord, MA

TABLE OF CONTENTS

LIST OF TABLES

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I. INTRODUCTION AND PURPOSE

This Remedial Design/Remedial Action (RD/RA) Statement of Work (SOW) defines the response activities and deliverables that W. R. Grace & Co. - Conn. (W. R. Grace or Grace) is obligated to perform or prepare in order to implement the Work required under the 1980 Consent Decree (Civil Action No. 80-748-C) at the W. R. Grace (Acton Plant) Superfund Site located in Acton & Concord, Massachusetts (the Site). The activities described in this SOW are based upon the United States Environmental Protection Agency (EPA) Record of Decision (ROD) for Operable Unit Three for the Site which was signed by the Office Director, Office of Site Remediation and Restoration, US EPA Region I, on September 30, 2005.

Pursuant to this SOW, W. R. Grace shall develop and implement the remedial actions in accordance with the September 2005, Record of Decision for Operable Unit Three, for the Site.

II. DEFINITIONS

The Site shall refer to the approximately 260 acres of property owned by W. R. Grace, located off of Independence Road in Acton, Massachusetts as well as all locations where contamination originating from the Site has come to be located. Other definitions provided in the Consent Decree are incorporated herein by reference. In addition, the following definitions shall apply to this SOW:

A. "Remedial Design" shall mean design of the remedial action selected in the ROD, pursuant to the Remedial Design work plans prepared under this SOW including, but not limited to:

1. all computations used to size units, determine the appropriateness of technologies, and estimate the projected effectiveness of the system;

2. materials handling and system layouts for the remedial action activities required for soil/sediment in the North Lagoon Wetland and Sinking Pond; and the extraction, treatment and disposal of groundwater. Design plans shall include size and location of units, treatment rates, location of electrical equipment and pipelines, and the location(s) and discharge limits for the effluent discharge;

3. scale drawings of all system layouts identified above and including, but not limited to, excavation cross-sections, and monitoring and recovery well cross-sections;

4. quantitative analysis demonstrating the anticipated effectiveness of the Remedial Design to achieve the Performance Standards, as defined in Section IV. of this SOW;

5. technical specifications which detail the following:

   a. size and type of each major component; and

   b. required performance criteria of each major component;

6. description of the extent of ambient air monitoring including equipment, monitor locations, and data handling procedures; and

7. description of access, land easements and/or other institutional controls required, to be supplied with the construction plans and specifications.

B. "Monitored Natural Attenuation" ("MNA") shall mean the reduction of contaminants in groundwater through natural mechanisms in the overburden and bedrock aquifer underlying the Site and includes long term monitoring.

C. "MassDEP" shall mean the Massachusetts Department of Environmental Protection.

III. SELECTED REMEDY IN THE 2005 RECORD OF DECISION

The Record of Decision (ROD) for Operable Unit Three of the W.R. Grace & Co. (Acton Plant) Superfund Site (September, 2005) describes the Remedial Action for the Site.

The major components of the selected remedy to be performed by W. R. Grace are as follows:

A. Clean up of contaminated sediments and soils that pose an unacceptable risk to human health and/or the environment in both Sinking Pond and the North Lagoon Wetlands;

B. Extraction and treatment of contaminated groundwater in the Southeast and Southwest Landfill Areas on the Grace property. Extraction and treatment of groundwater contamination from within the area of highest groundwater VOC concentrations within the Northeast Area;

C. A redesigned and/or modified Aquifer Restoration System that will treat extracted groundwater for both metals and organic contaminants. Treatment processes for extracted groundwater would include air stripping, activated carbon (for air treatment), any nuisance odor equipment and metals precipitation, prior to surface water discharge to Sinking Pond. Treated effluent from groundwater extracted from the Northeast Area may be diverted back to the Northeast Area Aquifer

(NAA) or, under appropriate conditions, discharged to Sinking Pond. The purpose of discharging treated effluent to the NAA would be to mitigate a decrease in yield of groundwater to the School Street public well field and/or to mitigate a decrease of stream flow to Fort Pond Brook, which is also located in the Northeast Area;

D. Monitored Natural Attenuation (MNA) of all areas of groundwater contamination not captured by the extraction system;

E. Institutional Controls such as deed restrictions and/or local ordinances to prevent unacceptable exposures to contaminated groundwater until cleanup levels are met and to protect against unacceptable future exposures to any waste(s) left in place on-Site; and

F. Long term groundwater, surface water and sediment monitoring and periodic five year reviews of the remedy.

IV. PERFORMANCE STANDARDS

W. R. Grace shall design, construct, operate, monitor, and maintain the Remedial Action in compliance with the ROD and all requirements of the Consent Decree and this SOW.

W. R. Grace shall clean-up the contaminated groundwater and sediment at the Site that exceed the Performance Standards, which include the groundwater and sediment cleanup levels listed in the following tables and all ARARS identified in the ROD.

The Interim Cleanup Levels for groundwater and Cleanup Levels for sediment, as presented in the September 2005 ROD, are as follows:

Interim Groundwater Cleanup Levels

Contaminant	Interim Cleanup Level (µg/l)
Antimony	6
Arsenic	10
Beryllium	4
Benzene	5
bis(2-Chloroethyl)ether	5
Bis(2-Ethylhexyl)phthalate	6
Chromium (Total)	100
1,2-Dichloroethane	5
1,1-Dichloroethene	7
1,2-Dichloropropane	5
Lead	15
Manganese	300[1]
Methylene chloride	5
Methyl tert-butyl ether (MTBE)	16
Nickel	100
Trichloroethene	5
Vinyl chloride	2

1. A background value, to be determined during the remedial design, may be selected as the interim groundwater cleanup level for Manganese.

Sediment Cleanup Levels for the Protection of Human Health for Sinking Pond & North Lagoon Wetlands[(1)]

Location	Chemical Name	Sediment Cleanup Level (mg/kg)
North Lagoon Wetlands	Arsenic	28
Sinking Pond	Arsenic	42
[(1)]Applies only to sediment that is accessible to humans.		

Sediment Cleanup Levels for the Protection of Ecological Receptors for Sinking Pond & North Lagoon Wetlands

Location	Chemical Name	Area	Sediment Cleanup Level (mg/kg)
Sinking Pond	Arsenic	Sediment with elevated arsenic, copper, iron, and manganese concentrations in the inlet and within the pond where the ground slope is relatively shallow (defined as areas SPBK-1 through SPBK-4 on ROD Figure 13) and that is consistently covered by less than twelve-feet of water. [1, 2]	42[a]
Sinking Pond	Arsenic	Sediment with elevated arsenic, copper, iron, and manganese concentrations within the pond but outside the areas specified above that is consistently covered by less than twelve feet of water. [1,3]	42[a]
North Lagoon Wetlands	Arsenic	Sediment 0-12 inches in depth with elevated arsenic concentrations.	28
North Lagoon Wetlands	Manganese	Sediment 0-12 inches in depth with elevated manganese concentrations.	2,030

(1) Sediment located between an elevation of 144.5 feet NGVD (maximum surface water elevation observed in the pond) and 128 feet NGVD (twelve feet below the minimum surface water elevation) will be evaluated.
(2) Short-term goal is to remediate areas with arsenic greater than 730 mg/kg or where the four chemicals of concern (arsenic, copper, iron, and manganese) exceed their Probable Effects Concentration (PEC) or Severe Effects Level (SEL) within the areas defined. Arsenic PEC=33 mg/kg, copper PEC=149 mg/kg, iron SEL=43,766 mg/kg, and manganese SEL=1,100 mg/kg.
(3) Short-term goal is to identify areas with arsenic greater than 730 mg/kg and the following three metals: copper, iron, and manganese exceed their PEC or SEL and then to evaluate the need to remediate such areas based on risks, feasibility and implementability. Copper PEC=149 mg/kg, iron SEL= 43,766 mg/kg and manganese SEL=1,100 mg/kg.
(a) Compliance will be met by long term monitoring to demonstrate a trend in sediment arsenic concentrations toward the maximum background concentration of 42 mg/kg within the top two inches of sediment.
NGVD- National Geodetic Vertical Datum

V. OVERSIGHT COSTS FOR REMEDIAL DESIGN/ REMEDIAL ACTION

Upon request, EPA will provide W.R. Grace with an estimate of past oversight costs and an estimate of future oversight spending for the RD/RA.

VI. REMEDIAL DESIGN

The Remedial Design activities required for the W. R. Grace (Acton Plant) Superfund Site shall include, but are not limited to: (a) an initial remedial steps phase; (b) revised Project Operations Plan (POP); (c) groundwater design; and (d) sediment design. W.R. Grace shall submit to EPA the required deliverables as stated herein for each of these Remedial Design activities. Except where expressly stated otherwise in this SOW, each deliverable shall be subject to review and approval by EPA as provided in the Consent Decree, after reasonable opportunity for review and comment by the Massachusetts Department of Environmental Protection (MassDEP).

A. Initial Remedial Steps Phase

The Initial Remedial Steps Phase shall consist of developing and implementing a site monitoring plan for groundwater.

1. Within 20 days after EPA approves the final RD/RA SOW, W. R. Grace shall submit a GROUNDWATER MONITORING PLAN to EPA for review and/or modification, after reasonable opportunity for review and comment by MassDEP. The GROUNDWATER MONITORING PLAN shall consist of groundwater monitoring of overburden and bedrock wells and provide for evaluation and reports of this data. This GROUNDWATER MONITORING PLAN shall also include a sampling program for VOCs (including 1,4 Dioxane) in a subset of Site wells and should also include inorganic analysis for the School Street Wellfield/aquifer (a current Town water supply), the Assabet Wellfield/aquifer (a current Town water supply), and the WRG-3 aquifer (a potential future Town water supply). Monitoring the groundwater in and around the School Street and Assabet Wellfields and WRG-3 will provide long term data that can be evaluated to determine trends (increasing, decreasing or steady state) of contamination in the groundwater. This information can be used by the Acton Water District to ensure that effective treatment can be provided.

2. After receiving EPA's approval of the GROUNDWATER MONITORING PLAN, W. R Grace shall begin implementation of the plan according to the schedule included in the approved plan. W.R. Grace shall submit GROUNDWATER MONITORING REPORTS to EPA and MassDEP as specified in the approved plan until approval or modification by EPA,

after reasonable opportunity for review and comment by MassDEP, of the monitoring program developed under the Groundwater Remedial Action.

3. Within 120 days after EPA approves this SOW, W. R. Grace shall submit to EPA for approval an evaluation of Interim Groundwater Clean-up Levels identified in the ROD to determine which contaminants, if any, are not Site-related or are naturally occurring at background concentrations. If necessary, W. R. Grace shall propose additional studies to resolve these issues. After completion of this evaluation, W. R. Grace may propose revised Interim Groundwater Clean-up Levels to EPA and MassDEP. Upon approval by EPA, after reasonable opportunity for review and comment by MassDEP, the Interim Groundwater Clean-up Levels list may be revised by removing compounds or revising cleanup levels.

4. Within 120 days after EPA approves this SOW, W. R. Grace shall coordinate with EPA's Office of Ecosystem Protection (OEP) to determine the appropriate standards for treated effluent discharge to Sinking Pond. W. R. Grace shall submit final discharge standards for EPA's approval, after reasonable opportunity for review and comment by MassDEP.

5. Within 30 days after EPA approves this SOW, W. R. Grace shall prepare and distribute monthly progress reports. These monthly progress reports should document current ongoing activities related to the RD/RA, identify the upcoming/planned activities for the next month, identify any issues or problems that need to be resolved, and identify any proposed changes that need to be made to the schedule. The progress reports shall include the status of laboratory results and validation.

6. At any time, W. R. Grace may petition EPA to discontinue pumping from existing ARS extraction wells that will not be part of the Groundwater Remedial Action. Any such petitions shall propose any necessary changes to the GROUNDWATER MONITORING PLAN that would be appropriate if the petition is approved. Such petitions shall be submitted to EPA for review and approval, after reasonable opportunity for review and comment by MassDEP. EPA will notify W. R. Grace in writing of its approval of any such petitions.

B. Revised POP

As specified in Sections VI.C, VI.D and VII of this SOW, W. R. Grace shall revise/amend the POP, as necessary during the RD/RA process. The REVISED POP will be prepared in accordance with substantive portions of guidance documents listed in Attachment A. The existing Remedial Investigation/Feasibility Study POP, dated March 10, 2000, will serve as a basis

for the RD/RA POP and will be amended/revised, as necessary. The REVISED POP shall include, but not be limited to, the following:

1. A Site Management Plan (SMP);

2. A Sampling and Analysis Plan (SAP) which includes:

   a. A Quality Assurance Project Plan (QAPP); and

   b. A Field Sampling Plan (FSP)

3. A site-specific Health and Safety Plan (HSP); and

4. A Community Relations Support Plan (CRSP).

C. Groundwater Design

The Groundwater Design will be broken out into two separate, but parallel tracks: 1) the Landfill Area Groundwater Design and 2) the Northeast Area Groundwater Design. Separating the groundwater design into two tracks will allow the Landfill Area Groundwater Remedy to move forward should complications and/or delays arise with the Northeast Area Groundwater Remedy. The Northeast Area Groundwater Design may require more extensive pre-design activities compared to the Landfill Area Groundwater Design. In addition, the design of the remedy for the Northeast Area may encounter delays due to issues related to property access, coordination with the Acton Water District, and/or consideration of the on-going remedial actions at other sites in the surrounding area. The design for the two components of the Groundwater Remedial Action will occur concurrently as described in Sections VI.C.1 and VI.C.2. In addition, the GROUNDWATER INSTITUTIONAL CONTROLS PLAN will proceed on its own schedule as described in Section VI.C.3.

1. Landfill Area Groundwater Design

   a. Landfill Area Groundwater Pre-Design Work Plan

      1) The Landfill Area Groundwater Pre-Design Phase shall consist of developing a LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN including any investigations or any other work that is necessary for developing the Landfill Area Groundwater Design.

      Within 90 days after EPA approves this SOW and at least 45 days after Landfill Area Groundwater Discharge Standards are finalized whichever is later, W.R. Grace shall

submit a LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN for review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. The LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN shall include at a minimum: detailed descriptions of all activities to be undertaken in connection with any investigations necessary for the design of the Landfill Area Groundwater Remedial Action. The detailed descriptions shall contain a statement of purpose and objectives of the investigations, identification of the specific activities necessary to complete the pre-design investigations, and a detailed schedule for performance of the pre-design investigations. In addition, it shall include, if necessary, a REVISED POP, which shall address all field work to be conducted during the Pre-Design Phase of the Landfill Area Groundwater Remedial Action. The LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN shall be consistent with the September 2005 ROD, this SOW, and EPA's current RD/RA guidance (OSWER Directive 9355.0-4a).

The LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN shall describe in detail, at a minimum, the following investigations to be undertaken during the Landfill Area Groundwater Design Phase:

a) Investigations to delineate, to the extent necessary for recovery well design, the depth of groundwater contamination in the Southwest Landfill Area.

b) Any other investigation required by EPA or proposed by W. R. Grace and approved by EPA, after reasonable opportunity for review and comment by MassDEP.

2) Within 30 days after EPA approves, after reasonable opportunity for review and comment by MassDEP, the LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN, W.R. Grace shall implement the approved plan, as follows:

a) A minimum of five working days prior to the implementation of the Landfill Area Groundwater Pre-Design field activities, written notice of such activities shall be provided to EPA and MassDEP.

b) Within 60 days after the completion of the Landfill Area Groundwater Pre-Design field activities, including receipt of laboratory data packages and completion of any necessary validation, the results/findings of the pre-design studies shall be provided to EPA in the LANDFILL AREA GROUNDWATER PRE-DESIGN RESULTS REPORT.

b. Landfill Area Groundwater Concept Design Submission

If the LANDFILL AREA GROUNDWATER PRE-DESIGN WORK PLAN does not include any significant work related to groundwater discharge standards, then, within 60 days after receiving EPA's approval of the Landfill Area Groundwater Treatment System discharge standards, W. R. Grace shall submit to EPA a LANDFILL AREA GROUNDWATER CONCEPT DESIGN for comment and/or modification by EPA, after reasonable opportunity for review and comment by MassDEP. If significant pre-design work related to the groundwater discharge standards is needed, then the LANDFILL AREA GROUNDWATER CONCEPT DESIGN will be due to EPA 90 days after receiving EPA's approval of the LANDFILL AREA GROUNDWATER PRE-DESIGN RESULTS REPORT. The LANDFILL AREA GROUNDWATER CONCEPT DESIGN should include a detailed description of how Grace will address each of the Landfill Area groundwater-related elements listed in Section III of this SOW.

The LANDFILL AREA GROUNDWATER CONCEPT DESIGN shall include, at a minimum:

1) The preliminary design assumptions and parameters, including (a) waste characterization; (b) pre-treating requirements; (c) volume and types of each medium requiring treatment; (d) treatment schemes (including all media and byproducts), rates, and required qualities of waste streams (i.e., input and output rates, influent and effluent qualities, potential air emissions, and so forth); (e) performance standards; (f) long-term performance monitoring and operations and maintenance (O&M) requirements; (g) compliance with all ARARs, pertinent codes, and standards; (h) technical factors of importance to the design and construction including use of currently accepted environmental control measures, constructability

of the design, and use of currently acceptable construction practices and techniques.

This design document shall also include a Summary and Detailed Justification of Assumptions including: (a) calculations supporting the assumptions; (b) a draft process flow diagram; (c) a detailed evaluation of how all groundwater-related ARARs will be met.

2) A preliminary Landfill Area Groundwater Remedial Action schedule that includes an evaluation of a phased approach to expedite any part and/or all of the Landfill Area Groundwater Remedial Action.

3) A set of preliminary drawings and schematics that is organized and clear. The preliminary drawings shall include (a) an outline or listing of proposed drawings and schematics; (b) process flow diagram; and (c) site drawings. Engineering drawings shall be submitted in full size and half size reproductions. Standard engineering formats shall be used in preparing design drawings.

4) If W. R. Grace concludes that it would be appropriate to design the Landfill Area Groundwater Remedial Action in some manner which is inconsistent with the September 2005 ROD, or that an ARAR cannot be met, Grace shall describe the issue(s) and recommend technical solutions in a memorandum to be submitted to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP. This review and approval is subject to the potential requirement for EPA to prepare and finalize an Explanation of Significant Differences (ESD) or ROD amendment.

c. Draft Final Landfill Area Groundwater Design Submission

Within 180 days after receiving EPA's comments and/or modifications on the LANDFILL AREA GROUNDWATER CONCEPT DESIGN and at least 30 days after the LANDFILL AREA GROUNDWATER PRE-DESIGN RESULTS REPORT is submitted to EPA, W. R. Grace shall then submit the DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN to EPA for comments and/or modifications, after reasonable opportunity for review and comment by MassDEP. This submission shall address approximately 95% of the total Remedial Design of the Landfill Area Groundwater Remedial Action as described in this

SOW, the September 2005 ROD, and approved Work Plans and deliverables. EPA's review shall generally focus on but not be limited to the main components of the design that relate to achieving the Landfill Area groundwater-related Performance Standards.

The DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN shall include, at a minimum:

1) A summary of how comments generated from review of the LANDFILL AREA GROUNDWATER CONCEPT DESIGN have been incorporated. Modifications of the design as a result of the incorporation of the comments shall be clearly identified.

2) A final schedule for implementation of the Landfill Area Groundwater Remedial Action that identifies the timing for initiation and completion of all critical path tasks and deliverables. The schedule shall specifically identify duration and expected completion of the construction of the groundwater extraction, treatment, and discharge system and any other major milestones.

3) A complete set of final construction drawings, plans and specifications (general specifications, drawings, and schematics). The final design plans and specifications must be consistent with the technical requirements of all groundwater-related ARARs. Information obtained during Landfill Area Groundwater Pre-Design shall be used to support the development of this design document. Before submitting the specifications, W. R. Grace shall coordinate and cross-check the drawings and technical specifications. A complete set of construction drawings and specifications as well as a set of one-half size reductions of drawings shall be submitted.

4) The following should be included: (a) plans and specifications for construction, installation, site preparation, and field work standards, including an equipment startup and operator training plan; (b) an outline or listing of drawings; (c) facility representations containing a process flow diagram; (d) a piping and instrumentation diagram; (e) a control logic table; and (f) typical vendor schematics for equipment and major system components (g) an updated detailed evaluation of how ARARs will be met; (h) a plan for minimization of environmental and public impacts; (i) a

plan for satisfying permitting requirements, if any; and (j) an updated evaluation of land acquisition, easement, and access requirements. This report shall also identify the projected O&M requirements.

5) A LANDFILL AREA GROUNDWATER CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN (LAGCQAPP). The LAGCQAPP shall be prepared in accordance with Appendix A of "Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, Interim Final" (EPA, 540/G-90/001, April 1990).

6) A REVISED POP, if necessary, which shall be prepared to support all field work to be conducted during the construction phase of the Landfill Area Groundwater Remedial Action.

7) If W. R. Grace concludes that it would be appropriate to design the Landfill Area Groundwater Remedial Action in some manner which is inconsistent with the September 2005 ROD and/or that an ARAR cannot be met, Grace shall describe the issue and recommend technical solutions in a memorandum to be submitted to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

d. Final Landfill Area Groundwater Design Submission

Within 45 days after receiving EPA's comments and/or modifications of the DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN from EPA, W. R. Grace shall submit the FINAL LANDFILL AREA GROUNDWATER DESIGN for review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. EPA's review shall generally focus on but not be limited to the main components of the design that relate to achieving the Landfill Area groundwater-related Performance Standards. This design submittal shall address 100% of the total Remedial Design of the Landfill Area Groundwater Remedial Action. The FINAL LANDFILL AREA GROUNDWATER DESIGN shall have addressed all comments and modifications generated by EPA and MassDEP.

e. Landfill Area Groundwater Design Project Meetings

W. R. Grace and its supervising contractor shall meet periodically with EPA and MassDEP (either in person or via conference call, whichever EPA decides) and/or their respective consultants during the Landfill Area Groundwater Design Phase to discuss the status of the Landfill Area Groundwater Design, present the results of any investigations, and to discuss any issues or problems associated with the development of the Landfill Area Groundwater Design.

Prior to each meeting, W. R. Grace shall submit to EPA and MassDEP: (i) an agenda for the meeting; (ii) a summary of the issues that will be discussed; and (iii) any supporting information, including any specific information required for the meeting, as detailed below. In addition to any other meetings, the following is a list of mandatory meetings to be held during the Landfill Area Groundwater Design Phase:

1) Landfill Area Groundwater Concept Design Meeting

Within 15 days after submittal of the LANDFILL AREA GROUNDWATER CONCEPT DESIGN, W. R. Grace shall schedule a LANDFILL AREA GROUNDWATER CONCEPT DESIGN meeting with EPA and MassDEP to discuss the LANDFILL AREA GROUNDWATER CONCEPT DESIGN.

During the LANDFILL AREA GROUNDWATER CONCEPT DESIGN meeting, Grace shall present the results of all investigations that have been completed, treatability studies, and the preliminary remedial design of the remedy based on these investigations and the LANDFILL AREA GROUNDWATER CONCEPT DESIGN.

2) Draft Final Landfill Area Groundwater Design Meeting

Within 15 days after submittal of the DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN, W. R. Grace and its contractors shall schedule a meeting with EPA and MassDEP. At this meeting, Grace shall present the results of the DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN including the LAGCQAPP and identify any changes made since the LANDFILL AREA GROUNDWATER CONCEPT DESIGN. The

DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN presentation shall cover, at a minimum:

a) a groundwater-related ARARs Compliance Matrix including a discussion of how groundwater-related ARARs will be met by the design and how performance will be monitored;

b) a description of the design basis for each component of the Landfill Area Groundwater Design;

c) plans, drawings, sketches, and calculations;

d) outlines of the required technical specifications; and

e) construction schedule(s).

3) Other Landfill Area Groundwater Meetings

EPA and/or MassDEP and/or W.R. Grace may also schedule additional meetings as necessary to discuss any issues or problems that arise during the Landfill Area Groundwater Remedial Design.

f. Landfill Area Groundwater Design Community Update

Prior to the initiation of Landfill Area Groundwater construction activities, W.R. Grace shall provide to EPA and MassDEP a draft of an update/fact sheet in order to keep the community informed and up to date.

2. Northeast Area Groundwater Design

a. Northeast Area Groundwater Pre-Design Work Plan

1) The Northeast Area Groundwater Pre-Design Phase shall consist of developing a NORTHEAST AREA GROUNDWATER PRE-DESIGN WORK PLAN including any investigations or any other work that is necessary for developing the Northeast Area Groundwater Design and a description of plans to coordinate the work with the Acton Water District.

Within 120 days after EPA approves this SOW, W.R. Grace shall submit a NORTHEAST AREA GROUNDWATER PRE-DESIGN WORK PLAN for

review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. The NORTHEAST AREA GROUNDWATER PRE-DESIGN WORK PLAN shall include at a minimum: detailed descriptions of all activities to be undertaken in connection with any investigations necessary for the design of the Northeast Area Groundwater Remedial Action. The detailed descriptions shall contain a statement of purpose and objectives of the investigations, identification of the specific activities necessary to complete the pre-design investigations, and a detailed schedule for performance of the pre-design investigations. In addition, it shall include, if necessary, a REVISED POP which shall address all field work to be conducted during the Pre-Design phase of the Northeast Area Groundwater Remedial Action. The NORTHEAST AREA GROUNDWATER PRE-DESIGN WORK PLAN shall be consistent with the September 2005 ROD, this SOW, and EPA's current RD/RA guidance (OSWER Directive 9355.0-4a).

The NORTHEAST AREA GROUNDWATER PRE-DESIGN WORK PLAN shall describe in detail, at a minimum, the following activities to be undertaken during the Northeast Area Groundwater Design Phase:

a) Evaluation of a targeted extraction and discharge system in the Northeast to determine appropriate pumping rates and locations that would take into consideration the drawdown and yield of groundwater to the School Street Wellfield and Fort Pond Brook as well as on-going remedial actions at other sites in the surrounding area. This effort will also include an evaluation to determine if the treated groundwater from the Northeast Area will be recharged back into this area (via re-injection or infiltration galleries) or be treated and then discharged to Sinking Pond. In addition, an evaluation shall be conducted to determine the location of the facility to treat groundwater extracted from the Northeast Area.

b) Evaluation, with the coordination of EPA's Office of Ecosystem Protection (OEP), of the appropriate standards for treated effluent discharge, if necessary, to the Northeast Area Aquifer (NAA).

c) Evaluation of Groundwater Circulation Well(s) (GCW) for targeted remediation of groundwater in the Northeast Area. If appropriate, conduct pilot test of GCW.

d) Any other investigation required by EPA or proposed by W. R. Grace and approved by EPA, after reasonable opportunity for review and comment by MassDEP.

2) Within 30 days after EPA approves, after reasonable opportunity for review and comment by MassDEP, the NORTHEAST AREA GROUNDWATER PRE-DESIGN WORK PLAN, W.R. Grace shall implement the approved plan, as follows:

a) A minimum of five working days prior to the implementation of the Northeast Area Groundwater Pre-Design field activities, written notice of such activities shall be provided to EPA and MassDEP.

b) Within 60 days after the completion of the Northeast Area Groundwater Pre-Design field activities including receipt of complete laboratory data packages and completion of any necessary data validation, the results/findings of the pre-design studies shall be provided to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP, in the NORTHEAST AREA GROUNDWATER PRE-DESIGN RESULTS REPORT.

b. Northeast Area Groundwater Concept Design Submission

Within 90 days after receiving EPA's approval of the NORTHEAST AREA GROUNDWATER PRE-DESIGN RESULTS REPORT, W. R. Grace shall submit to EPA a NORTHEAST AREA GROUNDWATER CONCEPT DESIGN for comment and/or modification by EPA, after reasonable opportunity for review and comment by MassDEP. The NORTHEAST AREA GROUNDWATER CONCEPT DESIGN should also include a detailed description of how Grace will address each of the Northeast Area groundwater-related elements listed in Section III of this SOW.

The NORTHEAST AREA GROUNDWATER CONCEPT DESIGN shall include, at a minimum:

1) The technical parameters, defined in detail, upon which the design will be based. Specifically, it shall include the preliminary design assumptions and parameters, including, as applicable, (a) waste characterization; (b) pre-treating requirements; (c) volume and types of each medium requiring treatment; (d) treatment schemes (including all media and byproducts), rates, and required qualities of waste streams (i.e., input and output rates, influent and effluent qualities, potential air emissions, and so forth); (e) performance standards; (f) long-term performance monitoring and operations and maintenance (O&M) requirements; (g) compliance with all ARARs, pertinent codes, and standards; (h) technical factors of importance to the design and construction, including use of currently accepted environmental control measures, constructability of the design, and use of currently acceptable construction practices and techniques.

   This design document shall also include a Summary and Detailed Justification of Assumptions including: (a) calculations supporting the assumptions; (b) a draft process flow diagram; (c) a detailed evaluation of how all groundwater-related ARARs will be met; (d) a plan for minimizing environmental and public impacts; and (e) a plan for satisfying permitting requirements, if any. Information obtained during the Northeast Area Groundwater Pre-Design shall be used to support the development of this report.

2) A preliminary Northeast Area Groundwater Remedial Action schedule that includes an evaluation of a phased approach to expedite any part and/or all of the Northeast Area Groundwater Remedial Action.

3) A set of preliminary drawings and schematics that is organized and clear. The preliminary drawings shall include (a) an outline or listing of proposed drawings and schematics; (b) a process flow diagram; and (c) site drawings. Engineering drawings shall be submitted in full size and half size reproductions. Standard engineering formats shall be used in preparing design drawings.

4) If W. R. Grace concludes that it would be appropriate to design the Northeast Area Groundwater Remedial Action in some manner which is inconsistent with the September 2005 ROD, or that an ARAR cannot be met, Grace shall describe the issue(s) and recommend technical solutions in a memorandum to be submitted to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

c. Draft Final Northeast Area Groundwater Design Submission

Within 180 days after receiving EPA's comments and/or modifications on the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN, W. R. Grace shall then submit the DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN to EPA for comments and/or modifications, after reasonable opportunity for review and comment by MassDEP. This submission shall address approximately 95% of the total Remedial Design of the Northeast Area Groundwater Remedial Action as described in this SOW, the September 2005 ROD, and approved Work Plans and deliverables. EPA's review shall generally focus on but not be limited to the main components of the design that relate to achieving the applicable groundwater-related Performance Standards.

The DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN shall include, at a minimum:

1) A summary of how comments generated from review of the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN have been incorporated. Modifications of the design as a result of the incorporation of the comments shall be clearly identified.

2) A final schedule for implementation of the Northeast Area Groundwater Remedial Action that identifies the timing for initiation and completion of all critical path tasks and deliverables.

3) A complete set of final construction drawings, plans and specifications (general specifications, drawings, and schematics). The final design plans and specifications must be consistent with the technical requirements of all groundwater-related ARARs. Before submitting the

specifications, W. R. Grace shall coordinate and cross-check the drawings and technical specifications. A complete set of construction drawings and specifications as well as a set of one-half size reductions of drawings shall be submitted.

4) The following plans should be included, as applicable: (a) plans and specifications for construction, installation, site preparation, and field work standards, including an equipment startup and operator training plan; (b) an outline or listing of drawings; (c) facility representations containing a process flow diagram; (d) a piping and instrumentation diagram; (e) a control logic table; (f) typical vendor schematics for equipment and major system components; (g) an updated detailed evaluation of how ARARs will be met; (h) a plan for minimization of environmental and public impacts; (i) a plan for satisfying permitting requirements, if any; and (j) an updated evaluation of land acquisition, easement, and access requirements. This report shall also identify the projected O&M requirements.

5) A NORTHEAST AREA GROUNDWATER CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN (NAGCQAPP). The NAGCQAPP shall be prepared in accordance with Appendix A of "Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, Interim Final" (EPA, 540/G-90/001, April 1990).

6) A REVISED POP, if necessary, which shall be prepared to support all field work to be conducted during the construction phase of the Northeast Area Groundwater Remedial Action.

7) If W. R. Grace concludes that it would be appropriate to design the Northeast Area Groundwater Remedial Action in some manner which is inconsistent with the September 2005 ROD and/or that an ARAR cannot be met, Grace shall describe the issue and recommend technical solutions or other revisions in a memorandum to be submitted to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

d. Final Northeast Area Groundwater Design Submission

Within 45 days after receiving EPA's comments and/or modifications of the DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN from EPA, W. R. Grace shall submit the FINAL NORTHEAST AREA GROUNDWATER DESIGN for review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. This design submittal shall address 100% of the total Remedial Design of the Northeast Area Groundwater Remedial Action. EPA's review shall generally focus on but not be limited to the main components of the design that relate to achieving the applicable groundwater-related Performance Standards. The FINAL NORTHEAST AREA GROUNDWATER DESIGN shall have addressed all comments and modifications generated by EPA and MassDEP.

e. Northeast Area Groundwater Design Project Meetings

W. R. Grace and its supervising contractor shall meet periodically with EPA and MassDEP (either in person or via conference call, whichever EPA decides) and/or their respective consultants during the Northeast Area Groundwater Design Phase to discuss the status of the Northeast Area Groundwater Design, present the results of any investigations, and to discuss any issues or problems associated with the development of the Northeast Area Groundwater Design.

Prior to each meeting, W. R. Grace shall submit to EPA and MassDEP: (i) an agenda for the meeting; (ii) a summary of the issues that will be discussed; and (iii) any supporting information, including any specific information required for the meeting, as detailed below. In addition to any other meetings, the following is a list of mandatory meetings to be held during the Northeast Area Groundwater Design Phase:

1) Northeast Area Groundwater Pre-Design Meeting

Within 10 days after W.R. Grace submits the NORTHEAST AREA GROUNDWATER PRE-DESIGN RESULTS REPORT, W.R. Grace shall schedule a NORTHEAST AREA GROUNDWATER PRE-DESIGN meeting with EPA and MassDEP to discuss the results and findings of the NORTHEAST AREA GROUNDWATER PRE-DESIGN work.

2) Northeast Area Groundwater Concept Design Meeting

Within 15 days after submittal of the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN, W. R. Grace shall schedule a NORTHEAST AREA GROUNDWATER CONCEPT DESIGN meeting with EPA and MassDEP to discuss the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN.

During the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN meeting, Grace shall present the results of all investigations that have been completed, treatability studies, and the preliminary remedial design of the remedy based on these investigations and the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN.

3) Draft Final Northeast Area Groundwater Design Meeting

Within 15 days after submittal of the DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN, W. R. Grace and its contractors shall schedule a meeting with EPA and MassDEP. At this meeting, Grace shall present the results of the DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN including the NAGCQAPP and identify any changes made since the NORTHEAST AREA GROUNDWATER CONCEPT DESIGN. The DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN presentation shall cover, at a minimum:

a) a groundwater-related ARARs Compliance Matrix including a discussion of how groundwater-related ARARs will be met by the design and how performance will be monitored;

b) a description of the design basis for each component of the Northeast Area Groundwater Design;

c) plans, drawings, sketches, and calculations;

d) outlines of the required technical specifications; and

e) construction schedule(s).

4) Other Northeast Area Groundwater Meetings

EPA and/or MassDEP and/or W.R. Grace may also schedule additional meetings as necessary to discuss any issues or problems that arise during the Northeast Area Groundwater Remedial Design.

f. Northeast Area Groundwater Design Community Update

Prior to the initiation of Northeast Area Groundwater construction activities, W.R. Grace shall provide to EPA and MassDEP a draft of an update/fact sheet and/or prepare for a public meeting in order to keep the community informed and up to date.

3. GROUNDWATER INSTITUTIONAL CONTROLS PLAN

Within 30 days after the DRAFT FINAL LANDFILL AREA GROUNDWATER DESIGN is submitted to EPA, W.R. Grace shall submit to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP, a GROUNDWATER INSTITUTIONAL CONTROLS PLAN. This plan shall include, but not be limited to: an evaluation of the long-term effectiveness and enforceability of various forms of groundwater-related institutional controls (local Town Ordinance, easements, Grant of Environmental Restrictions, regulatory action and/or deed restrictions); a draft of the proposed groundwater-related institutional control(s); a map depicting the areas/locations that the groundwater-related institutional control(s); an update of the 500-foot well exclusion zone compared to the latest plume maps; plans and schedule for implementation of groundwater-related institutional control(s); and plans and schedule for compliance monitoring of groundwater-related institutional controls by W. R. Grace. Upon EPA approval, Grace shall implement the plan in accordance with the schedule. The GROUNDWATER INSTITUTIONAL CONTROLS PLAN will be amended/modified, if necessary, after the DRAFT FINAL NORTHEAST AREA GROUNDWATER DESIGN is submitted to EPA.

D. Sediment Design

1. Sediment Pre-Design Phase

a. The Sediment Pre-Design Phase shall consist of developing a SEDIMENT PRE-DESIGN WORK PLAN including any investigations or any other work that is necessary for developing the sediment design.

Within 120 days after EPA approves the final SOW, W.R. Grace shall submit a SEDIMENT PRE-DESIGN WORK PLAN for review and approval by EPA, after reasonable opportunity for

review and comment by MassDEP. The SEDIMENT PRE-DESIGN WORK PLAN shall include at a minimum: detailed descriptions of all activities to be undertaken in connection with any investigations necessary for the pre-design of the Sediment Remedial Action. The detailed descriptions shall contain a statement of purpose and objectives of the investigations, identification of the specific activities necessary to complete the pre-design investigations, and a detailed schedule for performance of the pre-design investigations. In addition, a REVISED POP shall be prepared, if necessary, to support all field work to be conducted during the Pre-Design phase of the Sediment Remedial Action. The SEDIMENT PRE-DESIGN WORK PLAN shall be consistent with the September 2005 ROD, this SOW, and EPA's current RD/RA guidance (OSWER Directive 9355.0-4a).

The SEDIMENT PRE-DESIGN WORK PLAN shall describe in detail, at a minimum, the activities to be undertaken during the Sediment Pre-Design Phase:

1) Performance of pre-design studies, as necessary, to more fully delineate vertically and horizontally, the nature and extent of sediment exceeding cleanup levels identified in tables L-5 & L-6 of the September 2005 ROD, for Sinking Pond and the North Lagoon Wetlands. When determining the need for additional sampling and analysis, the sampling results provided in the letter report submitted by GeoTrans on September 13, 2005 to USEPA will be taken into consideration and included as an attachment to the SEDIMENT PRE-DESIGN WORKPLAN.

2) Evaluation of the slopes to determine human accessibility, as well as potential habitat(s) for the ecological receptors to determine the most appropriate method(s) for sediment clean up for Sinking Pond (i.e., whether it is appropriate to remove and/or cap/cover sediment which poses an unacceptable human health and/or ecological risk(s)).

3) Evaluation of sediments in the North Lagoon Wetland and Sinking Pond to determine whether or not materials are considered hazardous wastes under RCRA and the potential for contaminants to re-mobilize if sediment above clean up levels remains on site. Based upon the results of this evaluation, a proposed clean up plan for sediments consistent with the ROD (including a proposal for on-site or off-site disposal and, if appropriate, containment method(s)) shall be included as part of this evaluation.

4) Performance of a wetland assessment for areas in and around Sinking Pond to determine if and where wetlands exist. Should it be determined that wetlands exist in areas that would be impacted by response actions required in the ROD, an evaluation shall be conducted to determine how state and federal wetlands requirements (ARARs) will be met.

5) Performance of a wetland delineation and, if consolidation might be considered as a part of the remedial design, a habitat characterization evaluation to determine the functionality and value of the Sedge Marsh area located in the North Lagoon Wetlands. Based upon the conclusions reached in this evaluation, a proposal for addressing contaminated sediments in this portion of the Site shall be included.

6) If warranted, provide an evaluation and proposal that would include any capping/covering/consolidation standards, in accordance with appropriate ARARs.

7) Implementation of a design study to determine options for limiting the impacts of dewatering activities on wetland areas that will be affected by the Sediment Remedial Action.

8) Performance of an evaluation to determine which wetland areas will require wetland restoration work (and the types of restoration work).

9) Evaluation of implementation issues related to conducting sediment remediation in Sinking Pond with active groundwater discharge to the Pond.

10) Any other investigations required by EPA or proposed by W. R. Grace and approved by EPA, after reasonable opportunity for review and comment by MassDEP, consistent with the ROD

b. Within 30 days after EPA approves, after reasonable opportunity for review and comment by MassDEP, the SEDIMENT PRE-DESIGN WORK PLAN, W.R. Grace shall begin implementation of the approved plan, as follows:

1) A minimum of five working days prior to the implementation of the sediment pre-design field activities, written notice of such activities shall be provided to EPA and MassDEP.

2) Within 60 days after the completion of the pre-design field activities including receipt of complete laboratory data packages and completion of any necessary data validation, the results/findings of the sediment pre-design studies shall be provided to EPA, for review and approval, after reasonable opportunity for review and comment by MassDEP, in the SEDIMENT PRE-DESIGN RESULTS REPORT.

2. Sediment Concept Design Submission

Within 120 days after receiving EPA's approval of the SEDIMENT PRE-DESIGN RESULTS REPORT, W. R. Grace shall submit to EPA a SEDIMENT CONCEPT DESIGN for comment and/or modification by EPA, after reasonable opportunity for review and comment by MassDEP. The SEDIMENT CONCEPT DESIGN should also include a detailed description of how Grace will address each of the sediment-related elements listed in Section III of this SOW.

The SEDIMENT CONCEPT DESIGN shall include, at a minimum:

a. A Sediment Design Criteria Report that defines in detail the technical parameters upon which the design will be based. Specifically, the Sediment Design Criteria Report shall include the preliminary design assumptions and parameters, including (1) waste characterization; 2) volume and area of sediments to be addressed by the Sediment Remedial Action; (3) performance standards; (4) long-term performance monitoring and operations and maintenance (O&M) requirements; (5) compliance with all ARARs, pertinent codes, and standards; (6) technical factors of importance to the design and construction including use of currently accepted environmental control measures, constructability of the design, and use of currently acceptable construction practices and techniques.

b. A preliminary Sediment Remedial Action schedule that includes an evaluation of a phased approach to expedite any part and/or all of the Sediment Remedial Action, and projected timing for initiation, duration, and completion of all critical path tasks and deliverables.

c. A set of preliminary engineering drawings and an outline of the technical specifications for construction. Engineering drawings will include existing conditions drawings, plan view drawings presenting the location of the Sediment Remedial Action(s), and a list of all of the engineering drawings that will be included in the final design. Engineering drawings shall be submitted in full size and half size reproductions. Standard engineering formats shall be used for preparing design drawings.

d. A Basis of Sediment Design Report that provides a detailed description of the evaluations conducted to select the design approach. This report shall include a Summary and Detailed Justification of Assumptions. This summary shall include: (1) calculations supporting the assumptions; (2) a detailed evaluation of how all sediment-related ARARs will be met; (3) a plan for minimizing environmental and public impacts; and (4) a plan for satisfying permitting requirements, if any. Information obtained during sediment pre-design shall be used to support the development of this report.

e. A draft SEDIMENT INSTITUTIONAL CONTROLS PLAN that shall include, but not be limited to: an evaluation of the long-term effectiveness and enforceability of various forms of sediment-related institutional controls (local Town Ordinance, easements, Grant of Environmental Restrictions, regulatory action and/or deed restrictions); a draft of the proposed sediment-related institutional control(s); a map depicting the areas/locations for which sediment-related institutional control(s) will be required; plans and schedule for implementation of sediment-related institutional control(s); plans and schedule for compliance monitoring of implemented sediment-related institutional controls by W. R. Grace.

f. If W. R. Grace concludes that it would be appropriate to design the Sediment Remedial Action in some manner which is inconsistent with the September 2005 ROD, or that an ARAR cannot be met, Grace shall describe the issue(s) and recommend technical solutions in a memorandum to be submitted to EPA for review and approval, after reasonable opportunity for review and comment by MassDEP. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

3. Draft Final Sediment Design Submission

Within 120 days after receiving EPA's comments and/or modifications of the SEDIMENT CONCEPT DESIGN, W. R. Grace shall submit the

DRAFT FINAL SEDIMENT REMEDIAL DESIGN, to EPA, after reasonable opportunity for review and comment by MassDEP, for comments and/or modifications. This submission shall address approximately 95% of the total Sediment Remedial Design for each component of the Sediment Remedial Action as described in this SOW, the September 2005 ROD and approved Work Plans and deliverables.

The DRAFT FINAL SEDIMENT DESIGN SUBMISSION shall include, at a minimum:

a. A summary of how comments generated from review of the SEDIMENT CONCEPT DESIGN have been incorporated. Modifications of the design as a result of the incorporation of the comments shall be clearly identified.

b. An updated schedule for implementation of the Sediment Remedial Action.

c. A complete set of engineering drawings, plans and technical specifications. The engineering plans and technical specifications must be consistent with the technical requirements of all sediment-related ARARs. Before submitting the specifications, W. R. Grace shall coordinate and cross-check the engineering drawings and technical specifications. A complete set of construction drawings and specifications as well as a set of one-half size reductions of drawings shall be submitted.

d. A SEDIMENT CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN (SCQAPP). The SCQAPP shall be prepared in accordance with Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, Interim Final (EPA, 540/G-90/001, April 1990).

e. A REVISED POP, if necessary, which shall be prepared to support all field work to be conducted during the construction phase of the Sediment Remedial Action.

4. Final Sediment Design Submission

Within 45 days after receiving EPA's comments and/or modifications of the DRAFT FINAL SEDIMENT REMEDIAL DESIGN, W. R. Grace shall submit the FINAL SEDIMENT REMEDIAL DESIGN for review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. This design submittal shall address 100% of the total Sediment Remedial Design for each component of the Sediment Remedial Action. The FINAL SEDIMENT REMEDIAL DESIGN shall

have addressed all comments and modifications generated by EPA and MassDEP.

5. Sediment Design Project Meetings

W. R. Grace and its supervising contractor shall meet periodically with EPA and MassDEP (either in person or via conference call, whichever EPA decides) and/or their respective consultants during the sediment design phase to discuss the status of the sediment design, present the results of any investigations, and to discuss any issues or problems associated with the development of the sediment design.

Prior to each meeting, W. R. Grace shall submit to EPA and MassDEP: (i) an agenda for the meeting; (ii) a summary of the issues that will be discussed; and (iii) any supporting information, including any specific information required for the meeting, as detailed below. In addition to any other meetings, the following is a list of mandatory meetings to be held during the sediment design phase:

a. Pre-Design Meeting

Within 10 days after W.R. Grace submits the SEDIMENT PRE-DESIGN RESULTS REPORT, W.R. Grace shall schedule a Sediment Pre-Design meeting with EPA and MassDEP to discuss the results and findings of the Sediment Pre-Design work.

b. Sediment Concept Design Meeting

Within 15 days after submittal of the SEDIMENT CONCEPT DESIGN, W. R. Grace shall schedule a SEDIMENT CONCEPT DESIGN meeting with EPA and MassDEP to discuss the SEDIMENT CONCEPT DESIGN.

During the SEDIMENT CONCEPT DESIGN meeting, Grace shall present the results of all investigations that have been completed, treatability studies, and the preliminary remedial design of the remedy based on these investigations.

In addition, the SEDIMENT CONCEPT DESIGN presentation shall cover, at a minimum:

1) a Sediment ARARs Compliance Matrix including a discussion of how sediment ARARs will be met by the design and how performance will be monitored;

2) a description of the design basis for each component of the sediment design;

3) preliminary plans, drawings, sketches, and calculations;

4) outlines of the required technical specifications; and

5) preliminary construction schedule.

c. Draft Final Sediment Design Meeting

Within 15 days after submittal of the DRAFT FINAL SEDIMENT DESIGN, W. R. Grace and its contractors shall schedule a meeting with EPA and MassDEP. At this meeting, Grace shall present the results of the DRAFT FINAL SEDIMENT DESIGN including the SCQAPP and identify any changes made since the SEDIMENT CONCEPT DESIGN.

d. Other Sediment Meetings

EPA and/or MassDEP and/or W.R. Grace may also schedule additional meetings as necessary to discuss any issues or problems that arise during the Sediment Remedial Design.

6. Sediment Design Community Update

Prior to the initiation of sediment construction activities, W.R. Grace shall provide to EPA and MassDEP a draft of an update/fact sheet and/or prepare for a public meeting in order to keep the community informed with up-to-date information regarding the planned sediment remedial action.

VII. REMEDIAL ACTION PHASE

The Remedial Action activities required for the W. R. Grace (Acton Plant) Superfund Site include (a) Groundwater Remedial Action and (b) Sediment Remedial Action. W. R. Grace shall submit to EPA and MassDEP the required deliverables as stated herein for each of these Remedial Action activities. Each deliverable shall be subject to review, comment and/or modification by EPA, after reasonable opportunity for review and comment by MassDEP. Quality assurance of construction for the remedial actions will be performed by an independent third party hired by W.R. Grace. EPA quality assurance oversight will be performed in a manner that will not unnecessarily duplicate such quality assurance efforts by this independent third party.

A. Groundwater Remedial Action

As with the Groundwater Design, the construction and operation phases of the Groundwater Remedial Action will proceed on two separate, but parallel tracks: 1) the Landfill Area Groundwater Remedial Action and 2) the Northeast Area Groundwater Remedial Action. The construction and operation phases for the two components of the Groundwater Remedial Action will occur as described in Sections VII.A.1 and VII.A.2. Completion of the Groundwater Remedial Action, including Groundwater Compliance Monitoring and Final Groundwater Remedial Action Report(s), will not necessarily consider the Landfill Area and Northeast Area separately, and these phases of the Groundwater Remedial Action are described in Section VII.A.3.

1. Landfill Area Groundwater Remedial Action

a. Initiation of Landfill Area Groundwater Construction

After receiving EPA's approval of the FINAL LANDFILL AREA GROUNDWATER DESIGN, W. R. Grace shall initiate the Landfill Area Groundwater Remedial Action activities in accordance with the approved schedule contained therein.

b. Meetings During Landfill Area Groundwater Construction

W. R. Grace shall schedule and conduct a pre-construction conference prior to the initiation of construction. The participants shall include all parties involved in the Landfill Area Remedial Action, including W. R. Grace and its representatives, and EPA and MassDEP, and their representatives. The objectives of this conference are to review roles and responsibilities and contact information, and to provide an overview of the construction schedule.

In addition, during the Landfill Area Groundwater construction period, W. R. Grace and their construction contractor(s) shall meet (by telephone or in person, as EPA chooses) bi-weekly with EPA and MassDEP (and/or at other times as required by EPA) regarding the progress and details of construction. These conferences shall start within 10 days after construction begins, and continue until EPA determines that the conferences are no longer required or are not required for a specified period of time. If, during the construction of the Landfill Area Groundwater Remedial Action for the Site, conditions warrant modifications of the design, construction, and/or schedules, W. R. Grace may propose such design or construction or schedule modifications to EPA. Following approval by EPA, after reasonable opportunity for review and comment by MassDEP, Grace shall implement the design and/or construction and/or schedule modifications required.

c. Landfill Area Groundwater Operation and Maintenance Plan and Groundwater Monitoring Plan

Within 30 days before the estimated 75% Landfill Area Groundwater construction completion date, W.R. Grace shall submit to EPA for review and approval, after reasonable opportunity for review and comments by MassDEP: a) LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN to ensure the long term, continued effectiveness of each component of the Landfill Area Groundwater Remedial Action; and b) an updated GROUNDWATER MONITORING PLAN, if necessary. These plans shall include, at a minimum, the following:

1) LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE (O&M) PLAN shall include the following:

a) A description of normal operation and maintenance activities including start-up procedures, tasks for operation, tasks for maintenance, prescribed treatment or operation conditions, and schedule for each O&M task.

b) A description of potential operating problems including common and/or anticipated remedies and useful-life analysis of significant components.

c) A Landfill Area Groundwater O&M Quality Assurance Plan that includes a description of

routine monitoring tasks, required laboratory tests and their interpretation, required data collection, and location of monitoring points comprising the points of compliance monitoring.

d) Alternate procedures to prevent releases or threatened releases of hazardous substances, pollutants, or contaminants, which may endanger health and the environment or cause an exceedance of any cleanup standard.

e) Corrective action to be implemented in the event that discharge standards for groundwater surface water or air are exceeded or a nuisance odor exists and a schedule for implementing these corrective actions.

f) A Landfill Area Groundwater O&M Safety Plan that includes a description of precautions and necessary equipment for site personnel, safety tasks required in event of systems failure, and safety tasks necessary to address protection of nearby residents.

g) Description of equipment including the equipment identification numbers, installation of monitoring components, maintenance of site equipment, and replacement schedule for equipment and installed components.

h) Records and reporting mechanisms required including operating logs, laboratory records, mechanism for reporting emergencies, personnel and maintenance records, and reports to EPA, its designates, and MassDEP.

i) An outline of sampling and analysis to monitor the groundwater treatment system performance to demonstrate compliance with the effluent discharge limits including both chemical and toxicity testing.

j) An outline of a sampling and analysis plan to monitor any air emissions and/or odors from the groundwater extraction, treatment, and discharge system.

k) An outline of a plan to periodically measure and record flow rates and VOC concentrations and to calculate average flow rates and the amount of total VOC contamination removed by the extraction, treatment, and discharge system.

l) A well maintenance program including, at a minimum, the following: (1) a provision for prompt and proper abandonment, as appropriate, of wells used during previous response actions at the Site which are currently unusable or which become unusable during and/or after the Groundwater Remedial Action activities; and (2) a provision for continued maintenance or abandonment of wells used during previous response actions at the Site and/or additional wells used during the Groundwater Remedial Design, Groundwater Remedial Action and Groundwater Operation and Maintenance phases after completion of the Groundwater Compliance Monitoring Program described in Section VII.3.a of this SOW.

m) A REVISED POP, if necessary, which shall address all field work to be conducted according to the LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN. This REVISED POP shall be prepared in accordance with Section VI.B. above.

2) An updated GROUNDWATER MONITORING PLAN that details how W. R. Grace shall monitor the performance of the remedy over time. The GROUNDWATER MONITORING PLAN shall contain at a minimum the following:

a) an outline of sampling and analysis for groundwater monitoring that identifies the number and location of the monitoring wells to be used (including private irrigation wells and/or drinking water wells),

b) the frequency of sampling,

c) the analytical parameters,

d) sampling and analytical methods to be used to document groundwater quality, and

e) a justification for sampling rationale.

f) If necessary, a REVISED POP that addresses all fieldwork to be conducted according to the GROUNDWATER MONITORING PLAN shall be prepared. This REVISED POP shall be prepared in accordance with Section VI.B. above.

d. Start-up of Landfill Area Groundwater Extraction, Treatment and Discharge System

Within 30 days after EPA approves the LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN and updated GROUNDWATER MONITORING PLAN, and construction of the Landfill Area Groundwater extraction, treatment, and discharge system is complete, W. R. Grace shall start-up the system. W. R. Grace will notify EPA a minimum of five working days prior to start-up of the system. System start-up will follow the procedures outlined in the approved LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN.

e. Landfill Area Groundwater Pre-Final Certification Inspection

Within 30 days after W.R. Grace concludes that construction and start-up of the Landfill Area groundwater extraction, treatment, and discharge system has been fully (100% complete) performed, W.R. Grace shall schedule and conduct an on-Site LANDFILL AREA GROUNDWATER PRE-FINAL CERTIFICATION INSPECTION.

The LANDFILL AREA GROUNDWATER PRE-FINAL CERTIFICATION INSPECTION shall include participants from all parties involved in the Landfill Area Groundwater Remedial Action, including but not limited to W. R. Grace and their supervising contractor, EPA and MassDEP. The purpose of this inspection is to determine if the Remedial Action has been fully constructed in accordance with the ROD, the SOW and the LAGCQAPP, and is Operational and Functional. The meeting shall include an on-site inspection of the completed system and a review of as-built plans, drawings, specifications, existing O&M information, and treatment system performance data.

If only minor "punch list" items are noted during the inspection, then EPA, after reasonable opportunity for review and comment by MassDEP, will notify W. R. Grace within 15 days that

construction is complete and provide W. R. Grace with an Operational and Functional Determination, and the Pre-Final Certification Inspection will become the Final Certification Inspection. W. R. Grace shall then prepare the INTERIM LANDFILL AREA GROUNDWATER REMEDIAL ACTION REPORT as specified in Section VII.A.1.g of this SOW. Examples of minor "punch list" items are shown in EPA guidance # EPA-540-R-98-016, entitled: *Close Out Procedures for National Priorities List Site*, dated January 2000, exhibit 3-2.

If issues beyond minor "punch list" items are noted, then within 15 days of the Pre-Final Certification Inspection, EPA shall provide W.R. Grace with a summary of any deficient construction items (beyond minor "punch list" items) identified during the Pre-Final Certification Inspection. Within 30 days after receipt of EPA's summary of the Pre-Final Certification Inspection, W.R. Grace shall submit to EPA for approval, after reasonable opportunity for review and comment by MassDEP, a proposal to fully address all issues beyond minor "punch list" items identified during the Pre–Final Certification Inspection. After approval by EPA, W.R. Grace shall implement the proposed work and then provide EPA with a Landfill Area Corrective Action Report documenting any corrective action(s) taken to address any deficiencies.

f. Landfill Area Groundwater Final Certification Inspection

Within 15 days after W. R. Grace submits the LANDFILL AREA CORRECTIVE ACTION(S) REPORT, W. R. Grace shall schedule and conduct, if necessary, a LANDFILL AREA GROUNDWATER FINAL CERTIFICATION INSPECTION. This inspection shall include participants from all parties involved in the Landfill Area Groundwater Remedial Action, including but not limited to Grace and its contractors. The LANDFILL AREA GROUNDWATER FINAL CERTIFICATION INSPECTION shall include a discussion of the system components and operations, and an on-site inspection and operational demonstration of the remediation system. The purpose of this inspection is to determine if the Remedial Action has been fully constructed in accordance with the ROD, the SOW and the LAGCQAPP, and is Operational and Functional. EPA, after reasonable opportunity for review and comment by MassDEP, will then either require additional actions be taken or provide an Operational and Functional Determination. Should additional action(s) be required, Grace shall complete all additional actions identified until EPA provides notification that all construction

activities are 100% complete and this portion of the Remedial Action is Operational and Functional.

g. Interim Landfill Area Groundwater Remedial Action Report

Within 90 days after EPA determines that construction is complete and the remedial action is Operational and Functional, W. R. Grace shall submit an INTERIM LANDFILL AREA GROUNDWATER REMEDIAL ACTION REPORT for review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. The INTERIM LANDFILL AREA GROUNDWATER REMEDIAL ACTION REPORT shall document the completion of all physical construction and shall include, at a minimum, the following documentation:

1) Summary of Site conditions;

2) A chronological summary of all construction activities and procedures actually undertaken and materials and equipment used, handling and disposal of residual materials and air quality monitoring performed during all on-site activities;

3) Tabulation of all analytical data and field notes (full copies of all results and notes shall be available and produced for EPA and MassDEP upon request) prepared during the course of the Landfill Area Groundwater Remedial Design and Landfill Area Groundwater Remedial Action construction activities including, but not limited to:

   a) QA/QC documentation of these results; and

   b) Presentation of these results in appropriate figures;

4) A Landfill Area Construction Completion Report providing a summary of the implementation of the LAGCQAPP;

5) A description of construction, with appropriate photographs, maps and tables of each of the remedial activities for groundwater, and operation and maintenance activities;

6) A description of access/institutional controls established;

7) Conclusions regarding conformance of treatment processes with the Groundwater Performance Standards and, if

necessary, a schedule of future actions to be taken to achieve the specified Performance Standards;

8) Descriptions of actions taken and a schedule of any potential future actions to be taken to implement Landfill Area Groundwater O&M at the Site; and

9) A list of minor "punch list" items remaining to be completed as identified during the Pre-Final Certification Inspection and schedule for their completion. Upon approval by EPA, W.R. Grace shall complete this work in accordance with the approved schedule.

h. Landfill Area Groundwater Operation and Maintenance

Upon start-up of the Landfill Area Groundwater extraction, treatment, and discharge system, Grace shall implement all operation and maintenance activities in accordance with the terms and schedules set forth in the LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN approved by EPA. Along with the performance of the LANDFILL AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN, Grace shall continue to perform all activities required by the approved GROUNDWATER INSTITUTIONAL CONTROLS PLAN and all continuing monitoring and reporting activities required by the approved GROUNDWATER MONITORING PLAN.

i. Landfill Area Groundwater Operation Modifications

If during operation of the Landfill Area Groundwater Remedial Action, Site conditions warrant modification of the operations consistent with the National Contingency Plan, EPA or W. R. Grace may propose such modification. After approval by EPA, after reasonable opportunity for review and comment by MassDEP, W. R. Grace shall implement the modifications as approved by EPA. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

j. Petition for Discontinuation of the Landfill Area Groundwater Extraction

W. R. Grace may petition EPA to approve the discontinuation of the operation of all or portions of the Landfill Area Groundwater extraction system when groundwater quality data in that area of the

Site indicate that aquifer geochemical conditions have become less favorable for the dissolution and mobilization of naturally-occurring metals, and that MNA would be as effective in achieving groundwater cleanup goals (and protective) as continued pumping would be. W. R. Grace shall prepare a petition setting forth the basis of such a determination, including conditions under which operation must be resumed. The petition should also propose changes to the GROUNDWATER MONITORING PLAN, if any are necessary, that will occur should EPA approve the petition. This petition shall be submitted to EPA for review and approval, after a reasonable opportunity for review and comment by MassDEP. If EPA approves the petition, EPA will notify W. R. Grace.

Until such time as EPA approves this petition, W. R. Grace shall continue operation of the Landfill Area Groundwater extraction, treatment and discharge system in accordance with all requirements.

If EPA subsequently determines from the groundwater quality data that MNA is no longer as effective in achieving groundwater cleanup goals as continued pumping would be, EPA may require that pumping be resumed.

k. Petition to Decommission the Landfill Area Groundwater Extraction, Treatment and Discharge System

W. R. Grace may petition EPA to decommission all or portions of the Landfill Area Groundwater extraction, treatment, and discharge system. W. R. Grace shall prepare an evaluation setting forth the basis of such a determination. The focus of this evaluation shall be post-extraction groundwater quality and any groundwater modeling which supports the time frame for achieving groundwater cleanup goals under MNA compared to continued extraction, treatment and discharge. This evaluation shall be submitted to EPA for review and approval, after a reasonable opportunity for review and comment by MassDEP. If EPA approves the evaluation, EPA will notify W. R. Grace.

Until such time as EPA approves the decommissioning of all or portions of the Landfill Area Groundwater extraction, treatment, and discharge system, W. R. Grace shall monitor the integrity and maintain all or portions of the Landfill Area Groundwater extraction, treatment and discharge system in operable condition.

2. Northeast Area Groundwater Remedial Action

a. Initiation of Northeast Area Groundwater Construction

After receiving EPA's approval of the FINAL NORTHEAST AREA GROUNDWATER DESIGN, W. R. Grace shall initiate the Northeast Area Groundwater Remedial Action activities in accordance with the approved schedule contained therein.

b. Meetings During Northeast Area Groundwater Construction

W. R. Grace shall schedule and conduct a pre-construction conference prior to the initiation of construction. The participants shall include all parties involved in the Northeast Area Remedial Action, including W. R. Grace and its representatives, and EPA and MassDEP, and their representatives. The objectives of this conference are to review roles and responsibilities and contact information, and to provide an overview of the construction schedule.

In addition, during the Northeast Area Groundwater construction period, W. R. Grace and their construction contractor(s) shall meet (by telephone or in person, as EPA chooses) bi-weekly with EPA and MassDEP (and/or at other times as required by EPA) regarding the progress and details of construction. These conferences shall start within 10 days after construction begins, and continue until EPA determines that the conferences are no longer required or not required for a specified period of time. If, during the construction of the Northeast Area Groundwater Remedial Action for the Site, conditions warrant modifications of the design, construction, and/or schedules, W. R. Grace may propose such design or construction or schedule modifications to EPA. Following approval by EPA, after reasonable opportunity for review and comment by MassDEP, Grace shall implement the design and/or construction and/or schedule modifications required.

c. Northeast Area Groundwater Operation and Maintenance Plan and Groundwater Monitoring Plan

Within 30 days before the estimated 75% Northeast Area Groundwater construction completion date, W.R. Grace shall submit to EPA for review and approval, after reasonable opportunity for review and comments by MassDEP: a) NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN to ensure the long term, continued effectiveness of each component of the Northeast Area Groundwater Remedial Action and b) an updated

GROUNDWATER MONITORING PLAN, if necessary. These plans shall include, at a minimum, the following:

1) NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE (O&M) PLAN shall include, as applicable, the following:

   a) A description of normal operation and maintenance activities including start-up procedures, tasks for operation, tasks for maintenance, prescribed treatment or operation conditions, and schedule for each O&M task.

   b) A description of potential operating problems including common and/or anticipated remedies and useful-life analysis of significant components.

   c) A Northeast Area Groundwater O&M Quality Assurance Plan that includes a description of routine monitoring tasks, required laboratory tests and their interpretation, required data collection, and location of monitoring points comprising the points of compliance monitoring.

   d) Alternate procedures to prevent releases or threatened releases of hazardous substances, pollutants, or contaminants, which may endanger health and the environment or cause an exceedance of any cleanup standard.

   e) Corrective action to be implemented in the event that discharge standards for groundwater, surface water or air are exceeded or a nuisance odor exists and a schedule for implementing these corrective actions.

   f) A Northeast Area Groundwater O&M Safety Plan that includes a description of precautions and necessary equipment for site personnel, safety tasks required in event of systems failure, and safety tasks necessary to address protection of nearby residents.

   g) Description of equipment including the equipment identification numbers, installation of monitoring components, maintenance of site equipment, and

replacement schedule for equipment and installed components.

h) Records and reporting mechanisms required including operating logs, laboratory records, mechanism for reporting emergencies, personnel and maintenance records, and reports to EPA, its designates, and MassDEP.

i) An outline of sampling and analysis to monitor the groundwater treatment system performance to demonstrate compliance with the effluent discharge limits.

j) An outline of a sampling and analysis plan to monitor any air emissions and/or odors from the groundwater extraction, treatment, and discharge system.

k) An outline of a plan to periodically measure and record flow rates and VOC concentrations and to calculate average flow rates and the amount of total VOC contaminant removal from the extraction, treatment, and discharge system(s).

l) A well maintenance program including, at a minimum, the following: (1) a provision for prompt and proper abandonment, as appropriate, of wells used during previous response actions at the Site which are currently unusable or which become unusable during and/or after the Groundwater Remedial Action activities; and (2) a provision for continued maintenance or abandonment of wells used during previous response actions at the Site and/or additional wells used during the Groundwater Remedial Design, Groundwater Remedial Action and Groundwater Operation and Maintenance phases after completion of the Groundwater Compliance Monitoring Program as described in Section VII.3.a of this SOW.

m) If necessary, a REVISED POP that addresses all fieldwork to be conducted according to the NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN. This

REVISED POP shall be prepared in accordance with Section VI.B. above.

2) An updated GROUNDWATER MONITORING PLAN, if necessary, that details how W. R. Grace shall monitor the performance of the remedy over time. If necessary, a REVISED POP shall be prepared in support of all fieldwork to be conducted according to GROUNDWATER MONITORING PLAN. This REVISED POP shall be prepared in accordance with Section VI.B. above.

d. Start-up of Northeast Area Remedial Action System

Within 30 days after EPA approves the NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN and updated GROUNDWATER MONITORING PLAN, and construction of the Northeast Area Groundwater Remedial Action system is complete, W. R. Grace shall start-up the system. W. R. Grace will notify EPA and MassDEP a minimum of five working days prior to start-up of the system. System start-up will follow the procedures outlined in the approved NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN.

e. Northeast Area Groundwater Pre-Final Certification Inspection

Within 30 days after W.R. Grace concludes that construction and start-up of the Northeast Area Remedial Action system has been fully (100% complete) performed, W.R. Grace shall schedule and conduct an on-Site NORTHEAST AREA GROUNDWATER PRE-FINAL CERTIFICATION INSPECTION.

The NORTHEAST AREA GROUNDWATER PRE-FINAL CERTIFICATION INSPECTION shall include participants from all parties involved in the Northeast Area Groundwater Remedial Action, including but not limited to W. R. Grace and their supervising contractor, EPA and MassDEP. The purpose of this inspection is to determine if the Remedial Action has been fully constructed in accordance with the ROD, the SOW and the NAGCQAPP, and is Operational and Functional. The meeting shall include an on-site inspection of the completed system and a review of as-built plans, drawings, specifications, existing O&M information, and treatment system performance data.

If only minor "punch list" items are noted during the inspection, then EPA, after reasonable opportunity for review and comment by Mass DEP, will notify W. R. Grace within 15 days that

construction is complete and provide W. R. Grace with an Operational and Functional determination, and the Pre-Final Certification Inspection will become the Final Certification Inspection. W. R. Grace shall prepare the INTERIM NORTHEAST AREA GROUNDWATER REMEDIAL ACTION REPORT as specified in section VII.A.2.g of this SOW. Examples of minor "punch list" items are shown in EPA guidance # EPA-540-R-98-016, entitled: *Close Out Procedures for National Priorities List Site*, dated January 2000, exhibit 3-2.

If issues beyond minor "punch list" items are noted, then, within 15 days of the Pre-Final Certification Inspection, EPA shall provide W. R. Grace with a summary of any deficient construction items (beyond minor "punch list" items) identified during the Pre-Final Certification Inspection. Within 30 days after receipt of EPA's summary of the Pre-Final Certification Inspection, W.R. Grace shall submit to EPA for approval, after reasonable opportunity for review and comment by MassDEP, a proposal to fully address all issues beyond minor "punch list" items identified during the Pre-Final Certification Inspection. After approval by EPA, W. R. Grace shall implement the proposed work and then provide EPA with a Northeast Area Corrective Action(s) Report documenting any corrective action(s) taken to address any deficiencies.

f. Northeast Area Groundwater Final Certification Inspection

Within 15 days after W. R. Grace submits the NORTHEAST AREA CORRECTIVE ACTION(S) REPORT, W.R. Grace shall schedule and conduct, if necessary, a NORTHEAST AREA GROUNDWATER FINAL CERTIFICATION INSPECTION. This inspection shall include participants from all parties involved in the Northeast Area Groundwater Remedial Action, including but not limited to Grace and its contractors. The NORTHEAST AREA GROUNDWATER FINAL CERTIFICATION INSPECTION shall include a discussion of the system components and operations, and an on-site inspection and operational demonstration of all the remediation systems. The purpose of this inspection is to determine if the Remedial Action has been fully constructed in accordance with the ROD, the SOW and the NAGCQAPP, and is Operational and Functional. EPA, after reasonable opportunity for review and comment by MassDEP, will then either require additional actions be taken or provide an Operational and Functional Determination. Should additional action(s) be required, Grace shall complete all additional actions identified until EPA provides notification that all construction

activities are 100% complete and this portion of the Remedial Action is Operational and Functional.

g. Interim Northeast Area Groundwater Remedial Action Report

Within 90 days after EPA determines that construction is complete and that the Northeast Area Groundwater Remedial Action is Operational and Functional, W. R. Grace shall submit a NORTHEAST AREA GROUNDWATER REMEDIAL ACTION REPORT for review and approval by EPA, after reasonable opportunity for review and comment by MassDEP. The NORTHEAST AREA GROUNDWATER REMEDIAL ACTION REPORT shall document the completion of all physical construction and shall include, at a minimum, the following documentation:

1) Summary of Site conditions;

2) A chronological summary of all construction activities and procedures actually undertaken and materials and equipment used, handling and disposal of residual materials and air quality monitoring performed during all on-site activities;

3) Tabulation of all analytical data and field notes (full copies of all results and notes shall be available and produced for EPA and MassDEP upon request) prepared during the course of the Northeast Area Groundwater Remedial Design and Northeast Area Groundwater Remedial Action construction activities including, but not limited to:

   a) QA/QC documentation of these results; and

   b) Presentation of these results in appropriate figures;

4) A Northeast Area Construction Completion Report, providing a summary of the implementation of the NAGCQAPP;

5) A description of construction, with appropriate photographs, maps and tables of each of the remedial activities for groundwater, and operation and maintenance activities;

6) A description of access/institutional controls established;

7) Conclusions regarding conformance of treatment processes with the Groundwater Performance Standards; and, if necessary, a schedule of future actions to be taken to achieve the specified Performance Standards;

8) Descriptions of actions taken and a schedule of any potential future actions to be taken to implement Northeast Area Groundwater O&M at the Site; and

9) A list of minor "punch list" items remaining to be completed as identified during the Pre-Final Certification Inspection and schedule for their completion. Upon approval by EPA, W.R. Grace shall complete this work in accordance with the approved schedule.

h. Northeast Area Groundwater Operation and Maintenance

Upon start-up of the Northeast Area Groundwater Remedial Action system, Grace shall implement all operation and maintenance activities in accordance with the terms and schedules set forth in the NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN approved by EPA. Along with the performance of the NORTHEAST AREA GROUNDWATER OPERATION AND MAINTENANCE PLAN, Grace shall continue to perform all activities required by the approved GROUNDWATER INSTITUTIONAL CONTROLS PLAN and all continuing monitoring and reporting activities required by the approved GROUNDWATER MONITORING PLAN.

i. Northeast Area Groundwater Operation Modifications

If during operation of the Northeast Area Groundwater Remedial Action, Site conditions warrant modification of the operations consistent with the National Contingency Plan, EPA or W. R. Grace may propose such modification. After approval by EPA, after reasonable opportunity for review and comment by MassDEP, W. R. Grace shall implement the modifications as approved by EPA. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

j. Petition for Discontinuation and Decommissioning of the Northeast Area Groundwater Remedial Action System.

In the September 2005 ROD, EPA assumed that targeted groundwater extraction and treatment in the Northeast Area would

continue for approximately three years. After three years, W.R. Grace shall submit an evaluation to determine whether pumping should be discontinued and the system decommissioned. This evaluation shall consider the information contained on pages 68 and 69 of the ROD. At a minimum, the following three criteria will be included in the evaluation: 1) input from the AWD regarding yield and drawdown at the School Street Wellfield; 2) contaminant concentrations at each of the three School Street Wells (Christofferson, Lawsbrook, Scribner) and whether they are meeting, and are expected to continue to meet, MCLs; and 3) the effectiveness of the Northeast Area Remedial Action System. The Petition will be submitted to EPA for review and approval, after reasonable opportunity for review and comment by MassDEP.

Until such time as EPA approves this petition, W. R. Grace shall continue operation of the Northeast Area Groundwater extraction, treatment and discharge system in accordance with all requirements.

3. Completion of the Groundwater Remedial Action

It is expected that groundwater in some portions of the Site will meet Interim Groundwater Cleanup Levels faster than groundwater in other portions of the Site. As a result, W. R. Grace may petition EPA to close out the Site in phases so that those portions of the Site that cleanup faster can be closed out sooner. It is understood that the steps described below will eventually be done for the entire Site.

Completion of the Groundwater Remedial Action will involve: a) Demonstration of Groundwater Compliance Plan(s), b) Groundwater Compliance Summary Report(s), c) Human Health Risk Assessment(s) and d) Completion of Final Remedial Action Report(s), as described below.

a. Demonstration of Groundwater Compliance Plan(s)

When the Interim Groundwater Cleanup Levels specified in Table L-4 and all groundwater-related ARARs identified in the September 2005 ROD have been achieved for all or portions of the Site, W. R. Grace shall submit for approval, DEMONSTRATION OF GROUNDWATER COMPLIANCE PLAN(S) for defined portion(s) of the Site. The DEMONSTRATION OF GROUNDWATER COMPLIANCE PLAN(S) shall outline the sampling and methodology that is proposed to be done for three consecutive years to demonstrate that the remedy has met the Interim Groundwater Cleanup Levels as well as all other

groundwater-related ARARs. This plan shall contain at a minimum the following:

1) A Groundwater Compliance Monitoring Program that includes:

   a) an outline of sampling and analysis for groundwater monitoring that identifies the number and location of the monitoring wells to be used (including private irrigation wells and/or drinking wells);

   b) the frequency of sampling;

   c) the analytical parameters; and

   d) sampling and analytical methods to be used to document groundwater quality.

2) A description of the evaluations, including statistical and mathematical techniques, that will be done using the results from the Groundwater Compliance Monitoring Program to demonstrate that the remedy has met Interim Groundwater Cleanup Levels and groundwater-related ARARs.

The Groundwater Compliance Monitoring Program shall include, at a minimum, sampling at a regular frequency for all compounds for which there are Interim Groundwater Cleanup Levels. Compounds analyzed for at specific monitoring locations for the purpose of evaluating protectiveness (another requirement of the 2005 ROD) will not necessarily be limited to compounds which have historically been present in groundwater from the specific monitoring location at concentrations in excess of Interim Groundwater Cleanup Levels.

EPA shall review the plan and, if necessary, shall modify the proposed analyte list, sampling locations and sampling frequency to obtain three consecutive years of tabulated data needed for EPA to evaluate the cumulative human health risk(s) posed by any remaining residual groundwater contamination. Upon approval of the DEMONSTRATION OF GROUNDWATER COMPLIANCE PLAN, W.R. Grace shall implement the plan.

b. Groundwater Compliance Summary Report(s)

GROUNDWATER COMPLIANCE SUMMARY REPORT(S) shall document that groundwater-related Performance Standards,

have been met, and that groundwater-related Performance Standards will be maintained. The report shall summarize the data collection and analysis performed to demonstrate compliance as well as summarize the data necessary to perform the Human Health Risk Assessment of residual contamination. These report(s) shall be submitted to EPA for review and approval, after a reasonable opportunity for review and comment by MassDEP.

c. Human Health Risk Assessment(s)

EPA will conduct Human Health Risk Assessment(s) of residual contamination for portion(s) of the Site in which groundwater compliance monitoring has been completed. The Human Health Risk Assessment of residual contamination will evaluate and identify cumulative risk(s) related to Site related contaminants, non-Site related contaminants and any risks associated with naturally occurring substances. If the Human Health Risk Assessment demonstrates that the remedy is protective, then the Interim Groundwater Cleanup Levels will become the Final Groundwater Cleanup Standards for that portion of the Site in which compliance monitoring has been completed.

If the Human Health Risk Assessment demonstrates that the remedial action is not protective, the remedial action shall continue until either protective levels are achieved, and are not exceeded for a period of three consecutive years, or until the remedy is otherwise deemed protective, for example, through:

1) additional institutional controls;
2) a site specific risk management decision that could address non-Site related contamination or background conditions; or
3) other modifications to the remedy.

These protective residual levels shall constitute the Final Groundwater Cleanup Levels for the September 2005 ROD for Operable Unit Three, and shall be considered performance standards for this remedial action.

d. Completion of Final Groundwater Remedial Action Report(s)

After Groundwater Compliance Monitoring and Human Health Risk Assessments have been completed for all or portions of the Site and it has been determined that final groundwater cleanup standards have been consistently met for a period of three years, W. R. Grace shall submit FINAL GROUNDWATER REMEDIAL

ACTION REPORT(S) for all or portions of the Site to EPA for review and approval, after reasonable opportunity for review and comment by MassDEP. The FINAL GROUNDWATER REMEDIAL ACTION REPORT shall provide the information necessary to demonstrate that the groundwater-related Performance Standards have been met.

If EPA, after reasonable opportunity for review and comment by MassDEP, approves the report, EPA will evaluate delisting from the National Priorities List those portion(s) of the Site for which groundwater compliance has been demonstrated. W. R. Grace shall continue to perform operation and maintenance, monitoring, reporting, and other activities, if any, according to the terms and schedule set forth.

In the event of disapproval, W. R. Grace shall design, construct, operate and maintain the remedial action(s) in accordance with the terms and schedules as specified by EPA.

B. Sediment Remedial Action

1. Initiation of Sediment Construction

Within 20 days after receiving EPA's approval of the FINAL SEDIMENT DESIGN, prepared after reasonable opportunity for review and comment by MassDEP, and provided that the changes to the ARS that discharges to Sinking Pond have been implemented, W. R. Grace shall initiate the Sediment Remedial Action activities in accordance with the approved schedule contained therein.

2. Meetings During Sediment Construction

W. R. Grace shall schedule and conduct a pre-construction conference prior to the initiation of construction. The participants shall include all parties involved in the Sediment Remedial Action, including W. R. Grace and its representatives, and EPA and MassDEP, and their representatives. The objectives of this conference are to review roles and responsibilities and contact information, and to provide an overview of the construction schedule.

In addition, during the sediment construction period, W. R. Grace and their construction contractor(s) shall meet (by telephone or in person, as EPA chooses) bi-weekly with EPA and MassDEP (and/or at other times as required by EPA) regarding the progress and details of construction. These conferences shall start within 10 days after initiation of construction, and continue until EPA determines that the conferences are no longer required

or not required for a specified period of time. If, during the construction of the Sediment Remedial Action for the Site, conditions warrant modifications of the design, construction, and/or schedules, W. R. Grace may propose such design or construction or schedule modifications to EPA. Following approval by EPA, after reasonable opportunity for review and comment by MassDEP, Grace shall implement the design and/or construction and/or schedule modifications required.

3. Sediment Demonstration of Compliance and Maintenance Plan

Within 30 days before the estimated 75% sediment construction completion date, W.R. Grace shall submit to EPA for review and approval, after reasonable opportunity for review and comments by MassDEP, a SEDIMENT DEMONSTRATION OF COMPLIANCE AND MAINTENANCE PLAN to ensure the long term, continued effectiveness of each component of the Sediment Remedial Action, as well as, to define how compliance will be determined with regard to sediment cleanup levels specified in Tables L-5 and L-6 as well as all sediment-related ARARs identified in the September 2005 ROD. This plan shall include, at a minimum, the following:

a. A description of physical and chemistry tests and parameters to be sampled and analyzed for, a description and rationale of sampling locations, a sampling schedule detailing frequency of sampling for each test conducted, and a justification for sampling rationale;

b. An outline of the evaluations necessary to monitor the North Lagoon Wetlands and Sinking Pond after the completion of sediment clean up activities to evaluate the effectiveness and success of the wetland restoration efforts and appropriate corrective measures, if needed;

c. If contaminated sediments are consolidated/capped at the North Lagoon Wetlands, an outline of the sediment/surface water evaluations necessary to monitor the North Lagoon Wetlands for potential signs of re-deposition of significant concentrations of arsenic and/or manganese;

d. An outline of sampling and/or evaluations necessary for sediments in Sinking Pond to evaluate the progress towards meeting the long term ecological clean up goals for sediment in Sinking Pond in accordance with the requirements of the September 2005 ROD;

e. A description of monitoring and maintenance activities and schedule for each task;

f. A Sediment Monitoring and Maintenance Safety Plan that includes a description of precautions and necessary equipment for site personnel;

g. Records and reporting mechanisms required including operating logs, laboratory records, mechanism for reporting emergencies, personnel and maintenance records, and reports to EPA, its designates, and MassDEP;

h. Site closure and post-closure monitoring. If contaminated sediments are consolidated/capped at the North Lagoon Wetlands:

1) a cost estimate for post-closure care consistent with 40 C.F.R. Part 264;

2) establishment of a financial assurance mechanism for post-closure care consistent with 40 C.F.R. Part 264; and

3) post-closure inspection schedule and provisions for implementing such activities consistent with 40 C.F.R. Part 264; and

i. If necessary, a REVISED POP that addresses all fieldwork to be conducted according to the SEDIMENT DEMONSTRATION OF COMPLIANCE AND MAINTENANCE PLAN shall be prepared. This REVISED POP shall be prepared in accordance with Section VI.B. above.

4. Sediment Pre-Final Certification Inspection

Within 30 days after W.R. Grace concludes that construction of the Sediment Remedial Action is complete (100%), W.R. Grace shall schedule and conduct an on-Site SEDIMENT PRE-FINAL CERTIFICATION INSPECTION.

The SEDIMENT PRE-FINAL CERTIFICATION INSPECTION shall include participants from all parties involved in the Sediment Remedial Action, including but not limited to W. R. Grace and their supervising contractor, EPA and MassDEP. The purpose of this inspection is to determine if the Remedial Action has been fully constructed in accordance with the ROD, the SOW and the SCQAPP, and is Operational and Functional. The meeting shall include an on-site inspection of the completed remedy and a review of as-built plans, drawings, and specifications.

If only minor "punch list" items are noted during the inspection, then EPA, after reasonable opportunity for review and comment by MassDEP, will notify W. R. Grace that construction is complete and provide W. R. Grace with an Operational and Functional determination, and the Pre-Final Certification Inspection will become the Final Certification Inspection. W. R. Grace shall prepare the INTERIM SEDIMENT REMEDIAL ACTION REPORT as specified in Section VII.b.6 of this SOW. Examples of minor "punch list" items are shown in EPA guidance # EPA-540-R-98-016, entitled: *Close Out Procedures for National Priorities List Site*, dated January 2000, exhibit 3-2, example of minor "punch list" items.

If issues beyond minor "punch list" are noted, then, within 15 days of the Pre-Final Certification Inspection, EPA shall provide W. R. Grace with a summary of any deficient construction items (beyond minor "punch list" items) identified during the Pre-Final Certification Inspection. Within 30 days after receipt of EPA's summary of the Pre-Final Certification Inspection, W.R. Grace shall submit to EPA for approval, after reasonable opportunity for review and comment by MassDEP, a proposal to fully address all issues beyond minor "punch list" items identified during the Pre-Final Certification Inspection. After approval by EPA, W. R. Grace shall implement the proposed work and then provide EPA with a Sediment Corrective Action(s) Report documenting any corrective action(s) taken to address any deficiencies.

5. Sediment Final Certification Inspection

Within 15 days after W. R. Grace submits the SEDIMENT CORRECTIVE ACTIONS REPORT, W.R. Grace shall schedule and conduct, if necessary, a SEDIMENT FINAL CERTIFICATION INSPECTION. This inspection shall include participants from all parties involved in the Sediment Remedial Action, including but not limited to Grace and its contractors. The SEDIMENT FINAL CERTIFICATION INSPECTION shall include a discussion of the system components and an on-site inspection. The purpose of this inspection is to determine if the Remedial Action has been fully constructed in accordance with the ROD, the SOW and the SCQAPP, and is Operational and Functional. EPA, after reasonable opportunity for review and comment by MassDEP, will then either require additional actions be taken or provide an Operational and Functional Determination. Should additional action(s) be required, Grace shall complete all additional actions identified until EPA provides notification that all construction activities are 100% complete and this portion of the remedy is Operational and Functional.

6. Sediment Construction Summary Report

Within 90 days after EPA determines that construction is complete and the remedial action is Operational and Functional, W. R. Grace shall submit a SEDIMENT CONSTRUCTION SUMMARY REPORT. The SEDIMENT CONSTRUCTION SUMMARY REPORT shall document the completion of all physical construction and shall include, at a minimum, the following documentation:

a. Chronology of events and a summary of all procedures actually used to remediate contaminated sediment/soil, dispose of the materials excavated and/or capped and/or covered, restoration of wetlands, handling and disposal of residual material, and air quality monitoring performed during all on-site activities;

b. tabulation of all analytical data and field notes prepared during the course of the Sediment Remedial Design and Sediment Remedial Action activities (full copies of all results and notes shall be available and produced for EPA and MassDEP upon request) including, but not limited to:

   1) QA/QC documentation of these results; and

   2) Presentation of these results in appropriate figures;

c. A Sediment Construction Completion Report providing a summary of the implementation of the SCQAPP;

d. a description of construction, with appropriate photographs, maps and tables of each of the remedial activities for sediment and operation and maintenance activities;

e. evaluation regarding conformance of capping with the sediment-related Performance Standards;

f. a description of sediment institutional controls established;

g. a description of access controls established;

h. descriptions of actions taken and a schedule of potential future actions to be taken to implement sediment monitoring and maintenance at the Site; and

i. A list of minor "punch list" items remaining to be completed as identified during the Pre-Final Certification Inspection and schedule for their completion. Upon approval by EPA, W.R. Grace shall complete this work in accordance with the approved schedule.

7. Sediment Compliance Monitoring and Maintenance

Within 30 days after completion of the construction of the Sediment Remedial Action, Grace shall implement all monitoring and maintenance activities in accordance with the terms and schedules set forth in the SEDIMENT DEMONSTRATION OF COMPLIANCE AND MAINTENANCE PLAN approved by EPA. Along with the performance of the SEDIMENT DEMONSTRATION OF COMPLIANCE AND MAINTENANCE PLAN, Grace shall continue to perform all activities required by the approved SEDIMENT INSTITUTIONAL CONTROLS PLAN.

8. Operation Modifications

If during maintenance of the Sediment Remedial Action(s), Site conditions warrant modification of the operations consistent with the National Contingency Plan, EPA or W. R. Grace may propose such modification. After approval by EPA, after reasonable opportunity for review and comment by MassDEP, W. R. Grace shall implement the modifications as approved by EPA. This review and approval is subject to the potential requirement for EPA to prepare and finalize an ESD or ROD amendment.

9. Final Sediment Remedial Action Report(s)

Within 30 days after W.R. Grace believes final sediment/soil Performance Standards have been met (for Sinking Pond and/or the North Lagoon Wetlands) as required by the SEDIMENT DEMONSTRATION OF COMPLIANCE PLAN, W. R. Grace shall submit FINAL SEDIMENT REMEDIAL ACTION REPORT(S) to EPA for review and approval, after reasonable opportunity for review and comment by MassDEP. Separate reports may be submitted for Sinking Pond and the North Lagoon Wetland, as the timeframes for completion may be significantly different.

The FINAL SEDIMENT REMEDIAL ACTION REPORT(S) shall document that the sediment-related Performance Standards have been met. One of the Performance Standards for Sinking Pond may be attained by achieving a trend towards background concentrations within the top two-inches of sediment not accessible to humans. The FINAL SEDIMENT REMEDIAL ACTION REPORT(S) shall summarize the data collection and analysis performed to demonstrate compliance. Evidentiary assurances must be provided by W.R. Grace that sediment-related Performance Standards have been met and that sediment-related Performance Standards will be maintained. EPA will review the FINAL SEDIMENT REMEDIAL ACTION REPORT(S) prepared by W. R. Grace.

If EPA, after reasonable opportunity for review and comment by MassDEP, approves of the report, EPA will evaluate delisting from the National Priorities List that portion of the Site for which sediment compliance has been demonstrated. W. R. Grace shall continue to perform operation and maintenance, monitoring, reporting, and other activities, if any, according to the terms and schedule set forth.

In the event of disapproval, W. R. Grace shall design, construct, operate and maintain the sediment remedial action(s) in accordance with the terms and schedules as specified by EPA.

VIII. CERTIFICATION OF COMPLETION OF THE WORK

Within 45 days after W. R. Grace submits the last Final Remedial Action Report for the Site, W. R. Grace shall submit a petition to EPA requesting a Certificate of Completion for the Site. The petition shall be in the form of a letter and shall reference the Final Remedial Action Reports for the Site. These Final Remedial Action Reports provide the information necessary to demonstrate compliance with the Cleanup Standards and Performance Standards and protectiveness of the remedy. EPA will review the petition prepared by W. R. Grace. If EPA, after reasonable opportunity for review and comment by MassDEP, approves the petition, EPA will provide W. R. Grace with a Certificate of Completion for the Site and will evaluate delisting the Site from the NPL. W. R. Grace shall continue to perform operation and maintenance, monitoring, reporting and other activities, if any, according to the terms and schedule set forth

In the event of disapproval, W. R. Grace shall design, construct, operate and maintain the remedial action(s) in accordance with the terms and schedules as specified by EPA.

IX. SUBMISSIONS REQUIRING AGENCY APPROVAL

A. All plans, deliverables and reports identified in the SOW for submittal to EPA and MassDEP shall be delivered to EPA and MassDEP:

1. Three hard copies (and text in electronic form, other than a PDF format) shall be provided to Mr. Derrick Golden (HBO), Remedial Project Manager, USEPA, One Congress Street, Suite 1100, Boston, MA 02114, e-mail:golden.derrick@epa.gov.

2. One hard copy (and text in electronic form) shall be provided to Mr. Daniel Keefe, Project Manager, MassDEP, One Winter Street, Boston, MA 02108, e-mail: Daniel.Keefe@state.ma.us.

B. Any plan, deliverable, or report submitted to EPA and MassDEP for approval shall be printed using two-sided printing and marked "Draft" on each page and shall include, in a prominent location in the document, the following disclaimer: "Disclaimer: This document is a DRAFT document prepared by W. R. Grace under a government Consent Decree. This document has not undergone formal review by EPA and Massachusetts Department of Environmental Protection. The opinions, findings, and conclusions, expressed are those of the author and not those of the USEPA and MassDEP." In addition, use of the term approval for any plan, deliverable, or report, etc. submitted to EPA pursuant to this SOW shall mean it is subject to approval/disapproval pursuant to Sections IV. and XIII. of the Consent Decree.

C. Approval of a plan, deliverable or report does not constitute approval of any model or assumption used by W. R. Grace in such plan, deliverable or report.

ATTACHMENT A

PROJECT OPERATIONS PLAN REQUIREMENTS

Before any field activities commence on the Site, W.R. Grace shall submit several site-specific plans to establish procedures to be followed by W.R. Grace in performing field, laboratory, and analysis work and community and agency liaison activities. These site-specific plans include the:

A. Site Management Plan (SMP),
B. Sampling and Analysis Plan (SAP),
C. Health and Safety Plan (HSP), and
D. Community Relations Support Plan (CRSP).

These plans shall be combined to form the Site Project Operations Plan (POP). The existing RI/FS POP, dated March 10, 2000, will serve as a basis for the RD/RA POP and will be amended/revised, as necessary. The four components of the POP are described in Sections A. through D. herein.

The format and scope of each Plan shall be modified as needed to describe the sampling, analyses, and other activities that are clarified as the RD/RA progresses. EPA may modify the scope of these Plans at any time during the RD/RA at the discretion of EPA in response to the evaluation of RD/RA results, changes in RD/RA requirements, and other developments or circumstances.

A. Site Management Plan (SMP)

The overall objective of the Site Management Plan is to provide EPA and the Massachusetts Department of Environmental Protection (MassDEP) with a written understanding and commitment regarding how various project aspects such as access, security, contingency procedures, management responsibilities, waste characterization and disposal, budgeting, and data handling are being managed by W. R. Grace. The existing SMP, dated March 10, 2000, shall be amended/revised, as appropriate to include the following:

1. Provide a map and a list of properties, the property owners, and addresses of owners to whose property access may be required. This includes any private or Town owned property which will require deed restrictions/institutional controls/local Town(s) ordinance.

2. Clearly indicate the exclusion zone, contamination reduction zone, and clean area for on-site activities.

3. Establish necessary procedures and provide sample letters to land owners to arrange field activities and to ensure EPA and Massachusetts Department of Environmental Protection are informed of access-related problems and issues.

4. Provide for the security of government and private property on the Site.

5. Prevent unauthorized entry to the Site, which might result in exposure of persons to potentially hazardous conditions, prior to and including work being performed as part of the Remedial Action.

6. Secure access agreements for the Site;

7. Establish the location of a field office/trailer for on-site activities and/or meetings.

8. Provide contingency and notification plans for potentially dangerous activities associated with the RD/RA.

9. Provisions for monitoring of airborne contaminants that may be released by Site activities and which may affect the local populations shall be provided in the Health and Safety Plan.

10. Communicate to EPA, MassDEP, and the public, the organization and management of the RD/RA, including key personnel and their responsibilities.

11. Provide a list of contractors and subcontractors involved in the RD/RA activities and a description of their activities and roles.

12. Provide for the proper disposal of materials used and wastes generated during RD/RA (e.g., drill cutting, extracted ground water, protective clothing, disposable equipment). These provisions shall be consistent with the off-site disposal aspects of CERCLA, RCRA, and applicable state laws. W. R. Grace, or its authorized representative, or another party acceptable to EPA and MassDEP shall be identified as the generator of wastes for the purpose of regulatory or policy compliance.

13. Provide plans and procedures for organizing, managing, and presenting the data generated and for verifying its quality before and during the RD/RA. These procedures will include a description of the database management, as a required element of the current EPA QAPP guidance. The database management procedures will define data flow, database structure, data input fields, appropriate quality assurance/quality control (QA/QC), and capabilities of data manipulations for data users.

B. Sampling and Analysis Plan (SAP)

The SAP consists of both (1) a Quality Assurance Project Plan (QAPP) that describes the policy, organization, functional activities, and the quality assurance and quality control protocols necessary to achieve the data quality objectives dictated by the intended use of the data; and (2) the Field Sampling Plan (FSP) that provides guidance for all fieldwork by defining in detail the sampling and data-gathering methods to be used on a project. Components required by these two plans are described below.

The existing SAP, inclusive of the March 10, 2000 QAPP and FSP and any existing addenda, shall be the framework for all anticipated field activities (site background information, overall data quality objectives and measurement performance criteria, and standard operating procedures). The QAPP modifications that were implemented in support of the RI/FS for this project after the original QAPP was approved are documented in Table A-1. During the RD/RA, the SAP shall be revised as necessary to cover additional field or laboratory activities. Additional addenda will be generated, as needed, for field investigations in support of the RD/RA such that the QAPP addenda and FSP addenda will contain specific information on the field and analytical work being performed for the specific investigation (e.g., sampling locations and rationale, sample numbers and rationale, analyses of samples, specific sensitivity requirements, etc.). The purpose of the SAP and investigation-specific addenda is to ensure that additional data collection activities will be comparable to, and compatible with, previous data collection activities performed at the Site while providing a mechanism for planning and approving field activities. The overall objectives of the two documents comprising the SAP are as follows:

1. to document specific objectives, procedures, and rationales for fieldwork and sample analytical work;

2. to provide a mechanism for planning and approving Site and laboratory activities;

3. to ensure that sampling and analysis activities are necessary and sufficient; and

4. to provide a common point of reference to ensure the comparability and compatibility of all objectives and the sampling and analysis activities.

To achieve this last objective, the SAP, including the 2000 QAPP and FSP and subsequent addenda, shall document all field and sampling and analysis objectives as noted above, as well as all data quality objectives and specific procedures/protocols for field sampling and analysis.

The following critical elements of the SAP shall be described (either in the existing QAPP and FSP documents or in subsequent addenda to be prepared in support of this RD/RA) for each sample medium (e.g., ground water, surface water, soil, sediment, air, and biota) and for each sampling event. Consistent with discussions with EPA, QAPP and FSP Addenda will be

generated in support of the RD/RA only when objectives, procedures, or references differ from the existing QAPP or FSP, where all of the following 18 items have been previously defined.

1. sampling objectives. There can be many objectives, for example, engineering related, well yields, zone of influence, performance monitoring, demonstration of attainment, five year review, etc.;

2. data quality objectives (DQOs), including data uses and the rationale for the selection of analytical levels and detection limits, with QAPP addenda tables of DQOs to be generated if they differ from those set forth in the existing QAPP (see Guidance for the Data Quality Objectives Process, EPA QA/G-4 (EPA/600/R-96/055, August 2000); Data Quality Objectives Decision Errors Feasibility Trials (DEFT) Software QA/G-4D (EPA/240/B-01/007) September 2001); and Final Guidance Data Usability in Risk Assessment (Part A) (publication 9285.7-09A, April 1992, PB92-963356); Guidance for Data Usability in Risk Assessment (Part B). (publication 9285.7-09B, May 1992, PB92-963362)

3. site background update, including an evaluation of the validity, sufficiency, and sensitivity of existing data. These updates can be found in the Public Review Draft Remedial Investigation and Public Review Draft Feasibility Study (GeoTrans, July 1, 2005), the Public Review Draft Public Health Risk Assessment and Public Review Draft Baseline Ecological Risk Assessment (Menize-Cura Associates, July 1, 2005) and the Data Usability Summary Report (New Environmental Horizons, March 2, 2004).;

4. sampling locations and rationale;

5. sampling procedures and rationale and references;

6. numbers of samples and justification;

7. numbers of field blanks, trip blanks, and duplicates;

8. sample media (e.g., ground water, surface water, soil, sediment, air, and buildings, facilities, and structures, including surfaces, structural materials, and residues);

9. sample equipment, containers, minimum sample quantities, sample preservation techniques, maximum holding times;

10. instrumentation and procedures for the calibration and use of portable air, soil-, or water-monitoring equipment to be used in the field;

11. chemical and physical parameters in the analysis of each sample;

12. chain-of-custody procedures compliant with EPA NEIC Policies and Procedures Manual, EPA 330/9-78 001-R May 1978, revised May 1986 as described in the existing QAPP;

13. procedures to eliminate cross-contamination of samples (such as dedicated equipment);

14. sample types, including collection methods and if field and laboratory analyses will be conducted;

15. laboratory analytical procedures, equipment, and detection limits;

16. equipment decontamination procedures;

17. consistency with the other parts of the Work Plan(s) by having identical objectives, procedures, and justification, or by cross-reference;

18. for any limited field investigation (field screening technique), provisions for the collection and laboratory analysis of parallel samples and for the quantitative correlation analysis in which screening results are compared with laboratory results.

The SAP and associated addenda will be the framework of all anticipated field activities (e.g., sampling objectives, evaluation of existing data, standard operating procedures) and contain specific information on each round of field sampling and analysis work (e.g., sampling locations and rationale, sample numbers and rationale, analyses of samples). During the RD/RA, the SAP shall be revised as necessary to cover each round of field or laboratory activities. These revisions shall be in the form of addenda, as described above, for the QAPP and/or FSP, as necessary. SAP revisions or a statement regarding the need for revisions/addenda shall be included in each deliverable describing all new field work.

The SAP shall allow for notifying EPA, at a minimum, five working days before field sampling or monitoring activities commence. The SAP shall also allow split, replicate, or duplicate samples to be taken by EPA (or their contractor personnel), at EPA's request, provided such request is received a minimum of three days prior to the start of the field work, so that additional sample containers can be acquired for split sample collection. At the request of EPA, W. R. Grace shall provide these samples in appropriately pre-cleaned containers to the government representatives. Identical procedures shall be used to collect parallel split samples unless otherwise specified by EPA. Several references have been used to develop the existing SAP and shall be used to develop the SAP addenda. These include:

1. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01, EPA/540/G-89/004, October 1988);

2. Test Methods for Evaluating Solid Waste, Physical/Chemical Method (EPA Pub. SW-846, Third Edition, most recent update, http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm);

3. EPA Requirements for Quality Assurance Plans, EPA QA/R-5 (EPA/240/B-01/003) March 2001;

4. *Guidance for Quality Assurance Project Plans*, QA/G-5 (EPA/240/R-02/009) December 2002.

5. Region I, EPA-New England Quality Assurance Project Plan Program Guidance (April 2005);

6. Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4 (EPA/240B-06/001, February 2006);

7. Data Quality Objectives Decision Errors Feasibility Trials (DEFT) Software QA/G-4D (EPA/240/B-01/007) September 2001;

8. Systematic Planning: A Case Study for Hazardous Waste Site Investigations, EPA QA/CS-1 (EPA/240/B-06/004) February 2006;

9. Guidance for Preparing Standard Operating Procedures (SOPs) EPA QA/G-6 (EPA/240/B-01/004) March 2001;

10. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, Revised December 1996;

11. Data Quality Assessment: A Reviewer's Guide, EPA QA/G-9R (EPA/240/B-06/002) February 2006;

12. Data Quality Assessment: Statistical Tools for Practitioners, EPA QA/G-9S (EPA/240/B-06/003) February 2006.

B.1 Quality Assurance Project Plan (QAPP)

As previously stated, the existing site Quality Assurance Project Plan (QAPP, March 10, 2000) and its addenda (Table A-1) will serve as the basis for RD/RA activities. As EPA has reviewed the existing QAPP and determined that it contains 20 of the 24 required elements defined in EPA Requirements for Quality Assurance Plans (EPA QA/R-5, EPA/240/R-02/009, December 2002), an addendum will be prepared to raise the compliance of the existing QAPP to current EPA requirements. This addendum will cover the following four required items:

1. Distribution List
2. Training Requirements
3. Data Management

4. Data Reconciliation with DQOs

In addition, other QAPP addenda will be prepared, as necessary, during the course of the RD/RA to address the requirements of field investigations of additional media (e.g., air sampling) and/or chemicals for analysis (e.g., 1,4-dioxane in groundwater).

The existing QAPP plus addenda shall document in writing the site-specific objectives, policies, organizations, functional activities, sampling and analysis activities and specific quality assurance/quality control activities designed to achieve the data quality objectives (DQOs) of the RD/RA. The QAPP plus addenda shall document quality control and quality assurance policies, procedures, routines, and specifications.

Project activities throughout the RD/RA shall comply with the QAPP. QAPP sampling and analysis objectives and procedures shall be consistent with appropriate EPA guidance including the Uniform Federal Policy for Quality Assurance Project Plans, EPA-505-B-04-900A, B, & C, (March 2005) (April 2005), Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Pub. SW-846, Third Edition, December 1996, http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm) Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR, Part 136), and Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, (EPA-600/4-84-041 April 1984).

All the QAPP elements identified in EPA QA/R-5 will be addressed in the sum of the existing QAPP and subsequent addenda.

Information in a plan other than the QAPP may be cross-referenced clearly in the QAPP or QAPP addenda provided that all objectives, procedures, and rationale in the documents are consistent, and the reference material fulfills requirements of EPA/QA/R-5. EPA-approved references, or equivalent, or alternative methods approved by EPA shall be used, and their corresponding EPA-approved guidelines should be applied when they are available and applicable.

Laboratory QA/AC Procedures

The QA/QC procedures and SOPs for any laboratory (both fixed and mobile) used during the RD/RA shall be included in the W.R. Grace QAPP and addenda. When this work is performed by a contractor to a private party, each laboratory performing chemical analyses shall meet the following requirements:

1) be approved by the State Laboratory Evaluation Program, if available;

2) have successful performance in one of EPA's National Proficiency Sample Programs (i.e., Water Supply or Water Pollution Studies or the State's proficiency sampling program);

3) be familiar with the requirements of 48 CFR Part 1546 contract requirements for quality assurance; and

4) have a laboratory-specific Quality Assurance Plan for the laboratory including all relevant analysis. This plan shall be referenced as part of the contractor's QAPP.

Data Validation Procedures

W. R. Grace is required to certify that a representative portion of the data has been validated by a person independent of the laboratory according to the Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses Revised December 1996 (amended as necessary to account for the differences between the approved analytical methods for the project and the QAPP requirements. A data validation reporting package as described in the guidelines cited above must be delivered at the request of the EPA project manager. Approved validation methods shall be contained in the QAPP.

The independent validator shall not be the laboratory conducting the analyses and should be a person with a working knowledge of or prior experience with EPA data validation procedures. The independent validator shall certify that the data has been validated, discrepancies have been resolved if possible, and the appropriate qualifiers have been provided.

The Data Validation process and Reports for the media-specific chemistry sample results in support of the RD/RA will be compliant with the Tiered approach outlined in the Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses Revised December 1996. These specific data validation protocols have been described in the existing QAPP and will be amended, as necessary, in support of specific RD/RA investigations in QAPP addenda.

Laboratory Data Package requirements:

W. R. Grace is required to keep the complete data package and make it available to EPA on request in order for EPA to conduct an independent validation of the data. The complete data package shall consist of all results, the raw data, and all relevant QA/QC information. Raw data includes the associated chromatograms and the instrument printouts with area and height peak results. The peaks in all standards and samples must be labeled. The concentration of all standards analyzed with the amount injected must be included. All internal and external laboratory sample tracking information must also be included in the data package. The data reports will include the content of the forms contained in Chapter 1 of SW-846 (Second Edition 1982 as amended by Update I, April 1984, and Update II, April 1985) or the current CLP SOW forms, where applicable.

An example laboratory data package deliverable is listed below:

1) a summary of positive results and detection limits of non-detects with all raw data;

2) tabulated surrogate recoveries and QC limits from methods 8260 in SW-846/or laboratory control limits or QAPP limits and all QC and sample raw data;

3) tabulated matrix spike/matrix spike duplicate recoveries, relative percent differences, spike concentrations, and QC limits from methods 8260 and 6010 or 6020 in SW-846 and/or laboratory control limits or QAPP limits and all QC and sample raw data;

4) associated blanks (trip, equipment, and method with accompanying raw data for tests);

5) tabulated initial and continuing calibration results (concentrations, calibration factors or relative response factors and mean relative response factors, % differences and % relative standard deviations) with accompanying raw data;

6) tabulated retention time windows for each column;

7) a record of the daily analytical scheme (run logbook, instrument logbook) which includes samples, standards and order of analysis;

8) the chain of custody for the sample shipment groups, *DAS packing slip* (if applicable, samples maybe delivered by currier), *DAS analytical specifications;*

9) a laboratory narrative summary of method of analysis and any problems encountered during extraction or analysis (including deviations from method/QAPP QC requirements);

10) tabulated sample weights, volumes, and % solids used in each sample calculation;

11) example calculation for positive values and detection limits; and

12) SW-846 method (e.g. 8260, 6010, 6020, etc.) and QAPP-required QC data for all tests.

Laboratory reporting requirements have been defined, consistent with the above requirements, in the existing QAPP. Additions or changes to these requirements will be documented in QAPP addenda for RD/RA investigations, as necessary.

B.2 Field Sampling Plan (FSP)

Consistent with the approach to the QAPP, as part of the SAP, the existing FSP (March 10, 2000) will be the basis for RD/RA investigations. FSP addenda will be generated to address specific RD/RA investigations and media, if they differ from procedures described in the 2000 FSP. The objective of the FSP is to provide EPA and all parties involved with the collection and use of field data with a common written understanding of all field work. The FSP should be written so that a field sampling team unfamiliar with the Site would be able to gather the samples

and field information required. Guidance for the selection of field methods, sampling procedures, and custody can be acquired from the Compendium of Superfund Field Operations Methods (OSWER Directive 9355.0-14, EPA/540/P-87/001), December 1987, which is a compilation of demonstrated field techniques that have been used during remedial response activities at hazardous waste sites. The existing FSP, dated March 10, 2000, shall be amended/revised, as appropriate, to include the following elements:

1. Site Background. If the analysis of the existing Site details is not included in the Work Plan or in the QAPP, it must be included in the FSP. This analysis shall include a description of the Site and surrounding areas and a discussion of known and suspected contaminant sources, probable transport pathways, and other information about the Site. The analysis shall also include descriptions of specific data gaps and ways in which sampling is designed to fill those gaps. Including this discussion in the FSP will help orient the sampling team in the field.

2. Sampling Objectives. Specific objectives of sampling effort that describe the intended uses of data must be clearly and succinctly stated.

3. Sampling Location and Frequency. This section of the FSP identifies each matrix to be collected and the constituents to be analyzed. Tables shall be used to clearly identify the number of samples, the type of sample (water, soil, etc.), and the number of quality control samples (duplicates, trip blanks, equipment blanks, etc.). Figures shall be included to show the locations of existing or proposed sample points.

4. Sample Designation. A sample numbering system shall be established for the project. The sample designation should include the sample or well number, the sample round, the sample matrix (e.g., surface soil, ground water, soil boring), and the name of the Site.

5. Sampling Equipment and Procedures. Sampling procedures must be clearly written. Step-by-step instructions for each type of sampling that are necessary to enable the field team to gather data that will meet the Data Quality Objectives (DQOs). A list should include the equipment to be used and the material composition (e.g., Teflon, stainless steel) of equipment along with decontamination procedures.

6. Sampling Handling and Analysis. A table shall be included that identifies sample preservation methods, types of sampling jars, shipping requirements, and holding times. Examples of paperwork such as traffic reports, chain-of-custody forms, packing slips, and sample tags filled out for each sample as well as instructions for filling out the paperwork must be included. Field documentation methods including field notebooks and photographs shall be described.

C. Health and Safety Plan (HSP)

The objective of the site-specific Health and Safety Plan is to establish the procedures, personnel responsibilities and training necessary to protect the health and safety of all on-site personnel during the RD/RA. The plan shall provide procedures and plans for routine but hazardous field

activities, including work done near radioactive contamination, and for unexpected Site emergencies. The existing HSP, dated March 10, 2000, shall be amended/revised, as necessary.

The site-specific health and safety requirements and procedures in the HSP shall be updated based on an ongoing assessment of Site conditions, including the most current information on each medium. For each field task during the RD/RA, the HSP shall identify:

1. possible problems and hazards and their solutions;

2. environmental surveillance measures;

3. specifications for protective clothing;

4. the appropriate level of respiratory protection;

5. the rationale for selecting that level; and

6. criteria, procedures, and mechanisms for upgrading the level of protection and for suspending activity, if necessary.

The HSP shall also include the delineation of exclusion zones on a map and in the field. The HSP shall describe the on-site person responsible for implementing the HSP for W. R. Grace at the Site, protective equipment personnel decontamination procedures, and medical surveillance. The following documents shall be consulted:

1. Interim Standard Operations Safety Guides (Hazardous Response Support Division, Office of Emergency and Remedial Response EPA, Wash. D.C. 1982);

2. Superfund Public Health Evaluation Manual (OSWER Directive 9285.41, EPA/540/1-861060, EPA 1986);

3. Hazardous Waste Operations and Emergency Response (Department of Labor, Occupational Safety and Health Administration, (OSHA) 29 CFR Part 1910); and

4. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: Appendix B (NIOSH/OSHA/EPA 1986).

OSHA regulations at 40 CFR 1910 and Chapter 9 of the Interim Standard Operating Safety Guide, which describes the routine emergency provisions of a site-specific health and safety plan, shall be the primary reference used by W. R. Grace in developing and implementing the Health and Safety Plan.

The measures in the HSP shall be developed and implemented to ensure compliance with all applicable state and Federal occupational health and safety regulations. The HSP shall be updated at the request of EPA during the course of the RD/RA and as necessary.

D. Community Relations Support Plan (CRSP)

W. R. Grace shall develop a revised Community Relations Plan (CRP) to describe public information and public involvement activities anticipated during the RD/RA, operation & maintenance and delisting phases. W. R. Grace shall develop a Community Relations Support Plan, whose objective is to ensure and specify adequate support from W.R. Grace for the community relations efforts of EPA. This support shall be at the request of EPA and may include but is not limited to the following:

1. participation in technical meetings, including the provision of presentations, logistical support, visual aids and equipment;

2. preparation and/or publication and/or copying and/or mailing of community fact sheets or updates; and

3. preparation and/or supporting EPA and/or MassDEP for public informational meetings;.

4. assistance in placing EPA public notices in print.

Table A-1. Modifications and Amendments to the Site QAPP

Date of Amendment/Modification	Description of Amendment/Modification
May 31, 2000	Revision of Surface Water Quality Control information to lower the QAPP Reporting Limits (RLs) to more closely approach the National Recommended Water Quality Criteria for Priority Toxic Pollutants standard for human health for the consumption of organisms (HH-org criteria). Based on the desire to lower RLs for surface waters, Woods Hole Group Environmental Laboratories (WHGEL) was chosen to perform the analyses for this matrix rather than Severn Trent Laboratories (STL). STL remained as the laboratory responsible for Groundwater sample analyses, as indicated in the QAPP. Tables 7-1 through 7-5 of the QAPP were amended and supplemented with information for the surface water analyses (*e.g.,* WHGEL Method Detection Limits (MDLs), methods of analysis, etc.). In addition, the "Water RL" heading in Tables 7-2 through 7-5 of the original QAPP was amended to read "Groundwater RL".
June 16, 2000	Amendment of the Table 4-1 (Sample Preservation, Container Specification, and Holding Time Requirements for Laboratory Analyses) for low-level volatile sediment samples. Low-level volatile sediment preservation was changed from 5mL water with 1g sodium bisulfate to just 5mL water (sodium bisulfate eliminated) to avoid the formation of acetone and 2-butanone as a possible bi-product of using the sodium bisulfate with the sediment matrix. In addition, the holding time for volatile low-level sediments was reduced from 14 days to 7 days to account for the elimination of the sodium bisulfate preservative.
June 21, 2000	Revision to Table 7-1 to include Total Phosphorous analysis by WHGEL for sediments and revisions to Tables 3-2, 3-3, 3-4, 3-5, and 3-7 to define the specific Data Quality Objectives (DQOs) for Groundwaters, Surface Waters, and Sediments. Original QAPP DQOs were for "Water" based on STL method experience; however, addition of Surface Water as a matrix of concern for analysis by WHGEL necessitated amendment of the tables to change "Water" to "Groundwater" and to add the DQOs for the Surface Water matrix.
August 22, 2002	Addenda to QAPP Sections 3 and 7 tables to include DQOs and Reporting Limits for biota samples (fish, plants, and invertebrates) based upon an expanded ecological sampling activity at the site.